

**Annual Report to Congress
on Federal Government
Energy Management and
Conservation Programs
Fiscal Year 1998**

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AGENCY ACRONYMS

Commodity Futures Trading Commission	CFTC
Central Intelligence Agency	CIA
Department of Agriculture	USDA
Department of Commerce	DOC
Department of Defense	DOD
Department of Energy	DOE
Department of Health and Human Services	HHS
Department of Housing and Urban Development	HUD
Department of the Interior	DOI
Department of Justice	DOJ
Department of Labor	DOL
Department of State	ST
Department of Transportation	DOT
Department of the Treasury	TRSY
Department of Veterans Affairs	VA
Environmental Protection Agency	EPA
Equal Employment Opportunity Commission	EEOC
Federal Communications Commission	FCC
Federal Emergency Management Agency	FEMA
Federal Energy Regulatory Commission	FERC
Federal Trade Commission	FTC
General Services Administration	GSA
National Aeronautics and Space Administration	NASA
National Archives and Records Administration	NARA
National Science Foundation	NSF
Nuclear Regulatory Commission	NRC
Office of Personnel Management	OPM
Panama Canal Commission	PCC
Railroad Retirement Board	RRB
Social Security Administration	SSA
Tennessee Valley Authority	TVA
United States Information Agency	USIA
United States Postal Service	USPS

INTERNET WEB SITES CITED IN THIS REPORT

Federal Energy Management Program	www.eren.doe.gov/femp
Energy Efficiency and Renewable Energy Clearinghouse	www.eren.doe.gov
National Energy Information Center	www.eia.doe.gov
Alternative Fuels Data Center	www.afdc.nrel.gov
Clean Cities Program	www.ccities.doe.gov

EXECUTIVE SUMMARY

This report on Federal Energy Management for Fiscal Year (FY) 1998 provides information on energy consumption in Federal buildings, operations, and vehicles and equipment, and documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended, 42 U.S.C. §§ 8251-8259, 8262, 8262b-k, and Title VIII of NECPA, 42 U.S.C. § 8287-8287c. Implementation activities undertaken during FY 1998 by the Federal agencies under the Energy Policy Act of 1992 (EPACT) and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also discussed in this report.

Based on reports submitted to the Department of Energy (DOE) by 29 Federal agencies, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.49 quadrillion British Thermal Units (quads) during FY 1998.¹ These 1.49 quads consumed by the Government in buildings and operations to provide essential services to its citizens, including the defense of the Nation, represent approximately 1.6 percent of the total 94.23 quads² used in the United States. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

The Government consumed 1.04 quads during FY 1998 when measured in terms of energy actually delivered to the point of use (net energy consumption). Unless otherwise noted, this report uses the site-measured conversion factors to convert common units for electricity and steam to British Thermal Units (Btu). The total net energy consumption in FY 1998 decreased 27.8 percent from the FY 1985 base year. This reduction of 401.8 trillion Btu could satisfy the energy needs of the State of Idaho for more than one year.³

The total cost of the 1.04 quads was almost \$8.5 billion in FY 1998.⁴ This is \$2.0 billion less than the \$10.5 billion reported in FY 1985, an 18.8 percent⁵ decrease in nominal costs. In

¹Primary energy consumption considers all energy resources used to generate and transport electricity and steam. Tables 1-A, 4-A, and 7-B show primary energy consumption for comparison with net consumption, Tables 1-B, 4-B, and 7-A respectively. Conversion factors of 11,600 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate gross energy consumption.

²DOE/EIA-0384(98), *Annual Energy Review 1998*, July 1999.

³Based on net energy consumption estimates for 1994 in the residential, commercial, industrial, and transportation sectors (362.4 trillion Btu). Source: DOE/EIA-0214(96), *State Energy Data Report, 1996*, Tables 1 and 8; February 1999.

⁴Unless otherwise noted, all costs cited in this report are in constant 1998 dollars, calculated using Gross Domestic Product implicit price deflators. See DOE/EIA-0384(98), *Annual Energy Review 1998*, Table E1; July 1999. Costs noted as nominal dollars reflect the price paid at the time of the transaction and have not been adjusted to remove the effect of changes in the spending power of the dollar.

⁵Calculation of percent changes in this report do not account for rounding of numbers in text.

constant 1998 dollars, this equates to a decrease of 43.4 percent from \$15.0 billion in FY 1985 to \$8.5 billion in FY 1998, which reflects the reduced energy use and a 21.6 percent reduction in the inflation-adjusted cost of energy per quad. The Federal energy bill for FY 1998 increased 1.9 percent from the previous year.

Federal agencies report energy consumption under three categories: buildings and facilities, energy intensive operations, and vehicles and equipment.

Buildings and Facilities

In FY 1998, the Federal Government used 349.4 trillion British Thermal Units (Btu) to provide energy to approximately 500,000 buildings and facilities. This consumption represents a 25.8 percent decrease compared to FY 1985 and a 0.1 percent decrease relative to FY 1997. The cost of energy for buildings and facilities in FY 1998 was \$3.5 billion, a decrease of approximately \$61.8 million from FY 1997 expenditures, and a decrease of 38.4 percent from the FY 1985 expenditure of \$5.7 billion.⁶

During FY 1998, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities: direct appropriated funding, energy savings performance contracts (ESPCs), and utility-sponsored demand side management (DSM) incentives. Known funding from the three sources totaled approximately \$377.2 million in FY 1998. Direct appropriations accounted for approximately \$261.3 million. ESPC contracts awarded in FY 1998 resulted in \$114.4 million in estimated contractor investment, and agencies reported more than \$1.5 million in utility incentives received.

In FY 1998, direct appropriated funding identified by agencies for energy conservation retrofits and capital equipment increased 29.6 percent to \$261.3 million from \$202.5 million dollars in FY 1997. However, this is still 13.6 percent less than the FY 1995 appropriations.

Energy Intensive Operations

The energy intensive operations category covers energy used in buildings excluded from the 10 and 20 percent reduction goals for buildings and facilities under section 543 of NECPA, 42 U.S.C. §§ 8253(a)(2) and 8253(c). This category includes the energy consumed in industrial operations, certain research and development activities, and electronics-intensive facilities.

In FY 1998, the Federal Government used 65.9 trillion Btu of energy in energy intensive operations, approximately 6.3 percent of the total 1.04 quads consumed. Total energy consumption in this category increased 66.6 percent relative to FY 1985 and increased 0.7 percent relative to FY 1997. These increases are the result of changes in reporting procedures by individual agencies as well as changes in agency missions.

⁶Cost and consumption figures for FY 1985 may be different from those published in last year's Annual Report since Federal agencies update their files and provide revisions to their data.

The Federal Government spent \$621.3 million on energy intensive operations energy in FY 1998, \$52.9 million less than the FY 1997 expenditure of \$674.3 million constant dollars.

Vehicles and Equipment

The vehicles and equipment category includes aircraft and naval fuels, automotive gasoline, diesel fuel consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business, and the energy used in Federal construction.

In FY 1998, the Federal Government used approximately 627.7 trillion Btu of energy in vehicles and equipment, nearly 60.2 percent of the total 1.04 quads consumed. Total energy consumption in vehicles and equipment decreased 32.8 percent relative to FY 1985 and was 5.7 percent less than the FY 1997 consumption of 665.4 trillion Btu. The Department of Defense consumed 580.0 trillion Btu or 92.4 percent of all vehicles and equipment energy used by the Federal Government.

The Federal Government spent \$4.3 billion on vehicles and equipment energy in FY 1998, \$273.1 million more than the FY 1997 expenditure.

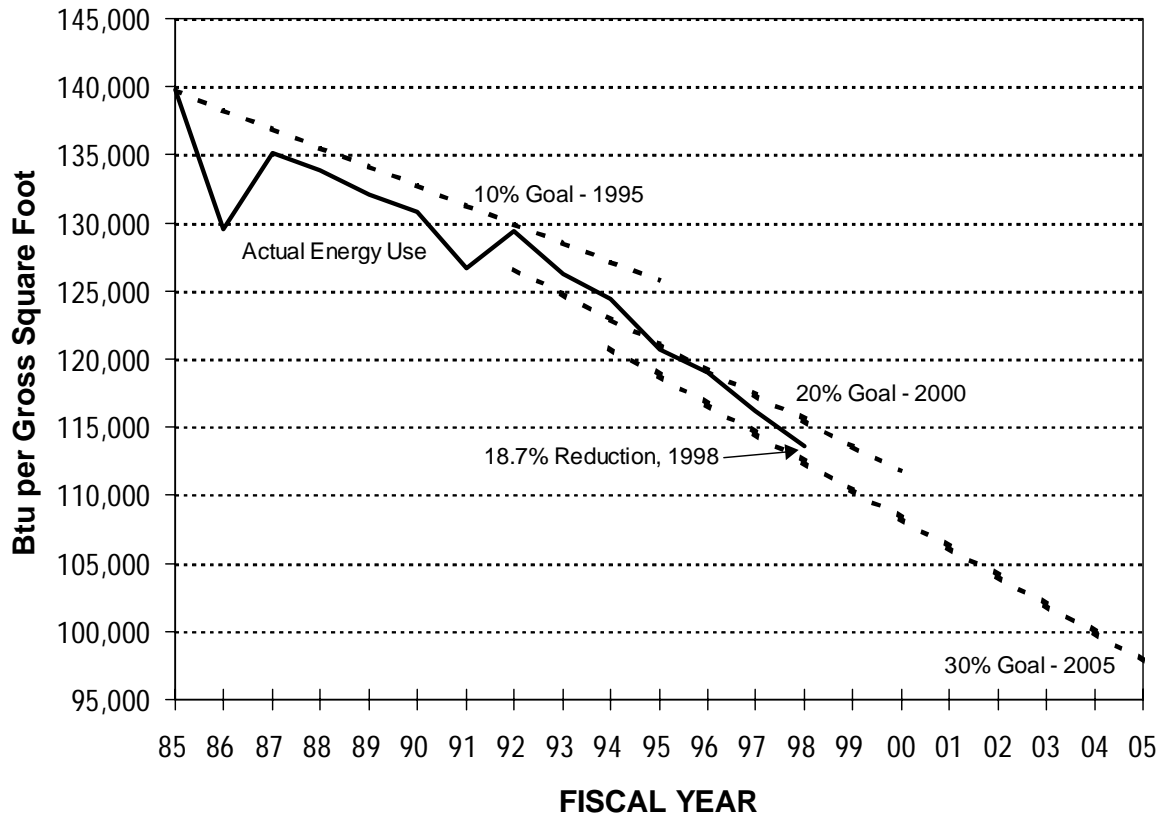
Agency Progress in Meeting Energy Reduction Goals

NECPA, as amended by EPACT, requires agencies to take the steps necessary to reduce energy consumption in Federal buildings by 10 percent by 1995 compared to 1985 consumption levels, based on Btu per gross square foot, and requires a 20 percent reduction by 2000 compared to 1985 consumption levels. The 10 percent goal was met by the Government in FY 1995 with a 13.7 percent reduction from FY 1985. Executive Order 12902 added an additional goal of reducing energy consumption by 30 percent by the year 2005 relative to 1985 consumption levels. During FY 1998 agencies provided data to DOE that indicated a decrease in energy consumption per gross square foot by 18.7 percent relative to FY 1985. The Government's performance for each year since FY 1985 is illustrated in Figure ES-1. This reduction was the result of significant decreases in the consumption of fuel oil, natural gas, and coal. The use of non-electric fuels in Federal buildings has declined approximately 39.0 percent since 1985, while the consumption of electricity has increased by only 4.0 percent. The installation and increased use of electricity-driven electronic equipment contributed to increases in electricity, which peaked in FY 1990 at 11.7 percent above FY 1985. Since FY 1990, electricity consumption has declined 6.9 percent. Electricity now represents about 72.6 percent of the total energy costs of Federal buildings and accounts for 42.9 percent of total net energy consumption in buildings. This is compared to 30.6 percent of the total net energy consumption in buildings in FY 1985.

Agency efforts undertaken in FY 1998 to increase energy efficiency in buildings included:

- improvement of operations and maintenance procedures;
- implementation of no-cost, low-cost efficiency measures;
- energy-efficient building retrofits and capital improvements;
- energy awareness activities and employee training programs; and
- procurement of energy-efficient goods and products.

FIGURE ES-1
Decrease in Btu per Gross Square Foot
in Federal Buildings and Facilities from FY 1985



Executive Order 12902 expands the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial facilities. Section 301(b) of Executive Order 12902 requires agencies to implement programs in industrial facilities to increase energy efficiency by at least 20 percent in FY 2005 in comparison to FY 1990 consumption levels to the extent that measures undertaken to achieve the goal are cost-effective.

Procurement of Energy-Efficient Products

Section 507 of Executive Order 12902 requires all Federal agencies to buy "best practice" products when practicable, when they meet the agency's specific performance requirements, and are cost-effective. Best practice products are those which are in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets Federal standards. During FY 1998, DOE continued its program to assist agencies in implementing the EPACT and Executive Order requirements for energy efficient procurement. In 1998, DOE's Federal Energy Management Program (FEMP) produced and distributed seven additional product energy efficiency recommendations to be added to the one-stop shopping guide, *Buying Energy Efficient Products*, to help Federal purchasers identify

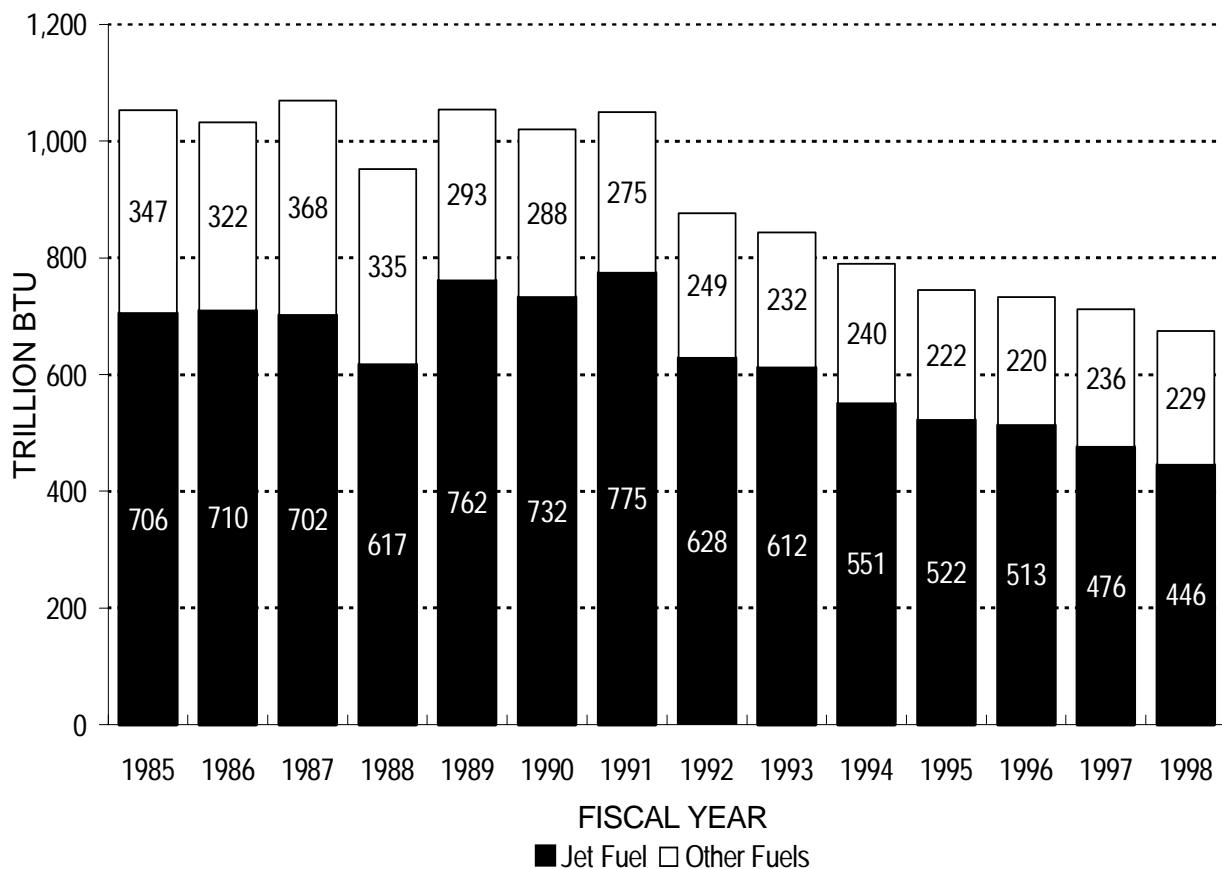
products which meet the energy efficiency requirements of Executive Order 12902. The guide now includes 29 product energy efficiency recommendations.

Reducing Petroleum-Based Fuel Consumption

Effective management of energy resources is of strategic importance to the Federal Government as well as the Nation. In FY 1998, petroleum-based fuels accounted for 0.67 quads of the total 1.04 quads consumed by the Federal Government, with 0.62 quads used by the Department of Defense, primarily for jet fuel and distillate/diesel for vehicles and equipment. The Federal Government consumed 35.9 percent less petroleum-based fuel in FY 1998 than in FY 1985. Figure ES-2 illustrates the trend in the Federal Government's use of petroleum fuels.

Due to the strategic nature of petroleum-based fuels, section 305 of Executive Order 12902 directs agencies to minimize the use of petroleum-based fuels in buildings and facilities. Federal agencies have made significant progress in reducing their dependence on petroleum-based fuels in their buildings and facilities. For example, Federal agencies report that in FY 1998, 40.3 trillion Btu of petroleum-based fuels were used for buildings and facilities energy, a 63.7 percent decrease from FY 1985 and a 4.0 percent decrease from FY 1997. This represents 11.5 percent of total buildings and facilities energy consumption.

FIGURE ES-2
Federal Consumption of Petroleum-Based Fuels
FY 1985 through FY 1998



Federal Energy Management Highlights

Progress is being made in increasing Federal energy efficiency, although there remain opportunities for greater efficiency and cost reduction. Several of the most important findings of this report are listed below:

- The overall real cost of energy consumption in the Federal Government has fallen from \$15.0 billion in FY 1985 to \$8.5 billion in FY 1998.
- Total net energy consumption in FY 1998 decreased 27.8 percent from FY 1985.
- Energy consumption in buildings in FY 1998 decreased 25.8 percent from FY 1985.
- On a Btu-per-gross-square-foot basis, the 18.7 percent reduction in buildings energy puts the Federal Government well on track to meet the 20 percent reduction goal for 2000.
- Five agencies, the Departments of Commerce, Energy, Justice, Transportation, and the National Aeronautics and Space Administration have surpassed a 20 percent reduction in buildings energy use per gross square foot from 1985.
- Energy consumption in FY 1998 was used for the following purposes:

<i>End Use</i>	<i>Percentage</i>	<i>Cost</i>
Buildings & Facilities	33.5 percent	\$3.5 billion
Energy Intensive Operations	6.3 percent	\$0.6 billion
Vehicles & Equipment	60.2 percent	\$4.4 billion

I. OVERVIEW OF FEDERAL ENERGY MANAGEMENT ACTIVITIES

A. Overview of Federal Energy Management Policy and Legislative Mandates

This report on Federal Energy Management for Fiscal Year (FY) 1998 provides information on energy consumption in Federal buildings and operations and documents activities conducted by Federal agencies to meet the statutory requirements of Title V, Part 3, of the National Energy Conservation Policy Act (NECPA), as amended, 42 U.S.C. §§ 8251-8259, 8262, 8262b-k and Title VIII of NECPA, 42 U.S.C. § 8287-8287c. Implementation activities undertaken during FY 1998 by the Federal agencies under the Energy Policy Act of 1992 (EPACT), Executive Order 12759 on Federal Energy Management, and Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, are also described in this report. In compliance with section 381(c) of the Energy Policy and Conservation Act (EPCA), as amended, 42 U.S.C. § 6361c, this report also describes the energy conservation and management activities of the Federal Government under the authorization of section 381 of EPCA, 42 U.S.C. § 6361.

Requirements of National Energy Conservation Policy Act (NECPA) and Energy Policy Act of 1992 (EPACT)

NECPA provides major policy guidance to Federal agencies to improve energy management in their facilities and operations. Amendments to NECPA made by the Federal Energy Management Improvement Act of 1988, 42 U.S.C. § 8253 (a)(1), required each agency to achieve a 10 percent reduction in energy consumption in its Federal buildings by FY 1995, when measured against a FY 1985 baseline on a Btu-per-gross-square-foot basis. It also directed DOE to establish life-cycle costing methods and coordinate Federal conservation activities through the Interagency Energy Management Task Force. Section 152 of Subtitle F of EPACT, Federal Agency Energy Management, further amends NECPA and contains provisions regarding energy management requirements, life-cycle cost methods and procedures, budget treatment for energy conservation measures, incentives for Federal facility energy managers, reporting requirements, new technology demonstrations, and agency surveys of energy-saving potential.

Requirements of Executive Orders 12759 and 12902

During FY 1998, two Executive Orders pertaining to energy management were in effect for Federal agencies. Executive Order 12759 on Federal Energy Management, signed by President Bush in April 1991, expanded the scope of Federal energy management activities beyond the NECPA requirements to include industrial facilities and Federal vehicles. Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, signed by President Clinton on March 8, 1994, supersedes Executive Order 12759 but leaves in effect sections 3, 9, and 10 of that Order.

The key requirements of the legislation and Executive Order authorities are outlined in the exhibit below along with current findings.

KEY REQUIREMENTS OF LEGISLATIVE AND EXECUTIVE ORDER AUTHORITIES

Statute/Directive	Requirement	FY 1998 Findings	Annual Report Discussion
Section 543, NECPA, 42 U.S.C., § 8253(a)(1) Executive Order 12902	20 percent reduction (Btu/GSF) by 2000 from 1985. 30 percent reduction (Btu/GSF) in Federal buildings by 2005 from 1985.	Federal agencies reported a 18.7 percent decrease in energy consumption in buildings in FY 1998, compared to FY 1985.	Section II (B), page 54
Section 545, NECPA, 42 U.S.C., § 8254	DOE to establish life-cycle cost methods to determine cost-effectiveness of proposed energy efficiency projects.	The 1998 edition of the energy price indices and discount factors for life-cycle cost analysis was published and distributed to Federal energy managers.	Section I (F), page 38
Section 545, NECPA, 42 U.S.C., § 8255	Transmit to Congress the amount of appropriations requested in each agency budget for electric and energy costs incurred in operating and maintaining facilities and for compliance with applicable statutes and directives.	Approximately \$261.3 million was appropriated and spent on energy efficiency projects in Federal facilities.	Section I (E), page 27
Section 546, NECPA, 42 U.S.C., § 8256(a)	Establishment of a program of incentives within Federal agencies to expedite Energy Savings Performance Contracts.	In FY 1998, 35 conventional ESPC contracts were awarded by agencies and 9 delivery orders were issued under DOE and DOD Super ESPCs.	Section I (E), page 33
Section 546, NECPA, 42 U.S.C., § 8256(b)	DOE to establish a Federal Energy Efficiency Fund to provide grants to agencies.	There were no appropriations for the Fund in FY 1998; FY 1995 funds were allocated and progress of the few remaining projects is being monitored.	Section I (E), page 31
Section 157, EPACT, 42 U.S.C., § 8262(c)	Federal agencies to establish and maintain programs to train energy managers and to increase the number of trained energy managers within each agency.	DOE's FEMP conducted 49 training workshops and symposia for more than 5,100 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.	Section I (D), page 20; Section V, Agency Reports, page 77
Executive Order 12902	20 percent reduction (Btu/GSF) for Federal industrial facilities by 2005 from 1990.	Findings are specific to individual agencies.	Section III (A), page 63

Statute/Directive	Requirement	FY 1998 Findings	Annual Report Discussion
Executive Order 12902	Conduct prioritization surveys to establish facility audit priorities. Implement 10-year plan to conduct comprehensive audits.	Findings are specific to individual agencies.	Section V, Agency Reports, page 77
Executive Order 12759 Executive Order 12902	Minimize the use of petroleum products for facilities operations or building purposes through switching to an alternative energy source if it is estimated to minimize life-cycle costs; improve the efficiency with which petroleum is used in facilities where alternative fuels are not practical or cost-effective.	The consumption of petroleum-based fuels in buildings during FY 1998 decreased 63.7 percent compared to FY 1985 and 4.0 percent from FY 1997.	Section II (A), page 46
Executive Order 12902	Agencies should strive to purchase products in the top 25 percent of their class for energy efficiency.	Seven new product energy efficiency recommendations were issued by DOE, bringing the total to 29.	Section I (G), page 38
Executive Order 12902	Agencies to ensure design and construction of new buildings meet or exceed whichever energy performance standards will result in a lower life-cycle cost over the life of the building. Also contains provisions for agencies to showcase their best efficiency and renewable energy projects.	The proposed rule, <i>Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings</i> revises the interim Federal standards to conform generally with the codified version of ASHRAE Standard 90.1-1989.	Section II (D), page 61; Section I (D), page 26

B. Overall Federal Energy Consumption, Costs, and Carbon Emissions

As shown in Table 1-A, the total primary energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.49 quadrillion British Thermal Units (quads) or 1,493,699.4 billion Btu during FY 1998. Primary energy consumption considers all resources used to generate and transport electricity and steam. (The source conversion factors of 11,600 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors used to calculate net energy consumption.) These 1.49 quads represent approximately 1.6 percent of the total 94.23 quads⁷ used in the United States, and reflect Government energy consumption in buildings and operations to provide essential services to its citizens, including the defense of the Nation. In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

Based on reports submitted to DOE by 29 Federal agencies, the Government consumed 1.04 quads during FY 1998 when measured in terms of energy actually delivered to the point of use (net consumption). As shown in Table 1-B, Federal agencies reported a 27.8 percent decrease in total net energy consumption compared to FY 1985, and a 3.5 percent decrease from FY 1997. The cost of this energy was \$8.5 billion and represented approximately 0.5 percent of the total Federal expenditures of \$1.652 trillion⁸ for all purposes in FY 1998. The Federal energy bill for FY 1998 rose 1.9 percent from the previous year, increasing \$158.3 million in constant dollars compared to FY 1997.⁹

In FY 1998, the Department of Defense spent \$6.3 billion for energy of the total Federal energy expenditure of \$8.5 billion. Overall, the Department of Defense used 33.1 percent less net energy in FY 1998 than in FY 1985.

Figures 1 and 2 depict the percentage of total energy used by the Federal Government in FY 1998 and its cost. As illustrated, jet fuel and electricity account for approximately 60.4 percent of the total energy consumption represented in Figure 1 and approximately 72.8 percent of the total energy costs in Figure 2.

Petroleum-based fuels used by the Federal Government are shown in Table 2. In FY 1998, petroleum-based fuels accounted for 0.67 quads (674,413.7 billion Btu) of the total 1.04 quads consumed by the Federal Government. Of that, approximately 0.62 quads (616,900.2 billion Btu) were used by the Department of Defense primarily for jet fuel and distillate/diesel for vehicles and equipment energy. Only 0.04 quads (40,335.3 billion Btu) of petroleum-based fuels were used for Federal buildings and facilities energy.

⁷DOE/EIA-0384(98), *Annual Energy Review 1998*, July 1999.

⁸*Analytical Perspectives, Budget of the United States Government, Fiscal Year 1998.*

⁹Appendix C indicates the annual cost of energy used in Federal buildings and facilities, vehicles and equipment, and energy intensive operations for FY 1985 through FY 1998. The combined cost per Btu for energy in each fiscal year is also shown in the table.

TABLE 1-A
TOTAL PRIMARY ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
USPS	50,965.1	59,097.8	60,543.2	62,372.2	66,638.9	68,794.2	71,122.5	72,974.3	77,219.9	78,105.4	53.3	1.1
DOE	97,530.8	89,471.1	86,100.8	89,434.3	86,005.9	85,216.0	87,272.7	87,241.0	76,266.5	69,891.0	-28.3	-8.4
VA	42,926.5	44,337.2	45,271.6	45,394.6	46,284.4	46,639.8	47,176.6	48,722.9	49,618.4	50,279.6	17.1	1.3
GSA	42,963.0	36,590.2	36,880.8	36,282.5	37,008.9	36,468.2	35,962.8	36,827.8	37,006.6	36,763.3	-14.4	-0.7
ST ¹	704.0	852.2	845.4	829.4	1,177.8	1,263.2	1,316.1	1,867.7	2,021.4	19,882.4	2,724.2	883.6
DOJ	11,026.6	11,474.0	14,162.8	12,961.0	14,835.4	16,632.6	16,988.4	20,590.3	20,066.7	24,693.2	123.9	23.1
HHS	10,831.3	16,191.3	14,353.7	15,857.0	16,264.1	16,497.0	12,010.3	12,642.0	14,755.3	14,414.6	33.1	-2.3
NASA	23,365.1	28,192.7	29,141.7	29,443.6	29,269.1	29,875.9	28,939.4	26,787.6	28,311.7	27,454.2	17.5	-3.0
DOT	28,447.5	28,379.3	29,029.7	30,713.0	33,831.2	29,865.5	28,329.5	31,426.4	30,542.2	31,950.0	12.3	4.6
DOI	11,486.5	10,864.3	10,955.6	10,643.5	11,828.6	12,156.2	10,428.9	7,525.1	10,147.6	10,102.0	-12.1	-0.4
USDA	12,152.0	14,397.6	14,590.7	14,039.6	14,426.5	14,494.1	14,851.9	14,099.9	12,272.1	12,972.8	6.8	5.7
TRSY	3,606.0	6,477.3	7,960.4	8,699.7	8,561.0	8,419.7	7,677.7	7,139.0	9,033.4	8,831.4	144.9	-2.2
DOL	3,920.0	4,103.2	4,186.7	4,209.9	4,324.2	4,403.2	4,279.0	4,381.1	4,415.2	4,459.7	13.8	1.0
TVA ²	1,899.5	1,887.1	1,958.1	1,830.8	1,917.5	7,436.2	7,484.9	7,172.5	6,985.7	6,757.7	255.8	-3.3
EPA	1,750.5	1,616.4	1,782.6	1,811.6	1,998.8	2,082.1	2,231.2	2,172.7	2,211.8	2,181.1	24.6	-1.4
DOC	4,038.8	6,327.7	4,536.0	4,372.8	4,636.9	5,392.2	5,585.1	5,297.0	5,251.9	4,933.8	22.2	-6.1
HUD	349.3	426.5	449.7	417.7	380.2	354.4	341.5	358.4	348.8	333.8	-4.5	-4.3
FCC	42.0	50.1	50.9	41.3	42.3	46.0	46.0	36.4	38.8	38.3	-8.8	-1.3
PCC	1,189.4	1,399.5	1,358.9	1,461.0	1,467.0	1,479.4	1,687.2	1,683.2	1,634.2	0.0	-100.0	-100.0
OTHER*	986.7	4,068.2	3,079.3	3,136.0	3,489.2	4,418.4	6,782.8	9,345.5	10,165.5	9,703.9	883.4	-4.5
CIVILIAN AGENCIES												
TOTAL	350,180.6	366,203.6	367,238.4	373,951.5	384,387.9	391,934.3	390,514.8	398,290.8	398,313.8	413,748.0	18.2	3.9
DOD	1,494,704.2	1,536,176.1	1,554,075.0	1,388,726.4	1,330,916.1	1,253,516.9	1,189,980.4	1,158,615.9	1,127,262.1	1,079,951.4	-27.7	-4.2
ALL AGENCIES												
TOTAL	1,844,884.8	1,902,379.7	1,921,313.4	1,762,677.8	1,715,304.1	1,645,451.2	1,580,495.1	1,556,906.7	1,525,575.9	1,493,699.4	-19.0	-2.1
MBOE	316.7	326.6	329.8	302.6	294.5	282.5	271.3	267.3	261.9	256.4		
Petajoules	1,946.3	2,006.9	2,026.9	1,859.6	1,809.6	1,735.9	1,667.4	1,642.5	1,609.4	1,575.8		

DATA AS OF 01/10/00

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FERC.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

²TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

Note: This table uses a conversion factor for electricity of 11,600 Btu per kilowatt hour and 1,390 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 1-B
TOTAL NET ENERGY CONSUMPTION BY FEDERAL AGENCIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
USPS	27,762.5	30,616.2	30,817.0	31,674.2	33,725.1	34,950.8	36,220.9	36,427.1	40,760.0	39,876.9	43.6	-2.2
DOE	52,271.5	43,467.5	42,178.6	44,300.2	43,688.5	42,279.2	47,089.7	44,424.9	33,926.3	31,450.1	-39.8	-7.3
VA	25,144.7	24,898.4	25,050.4	25,254.9	25,741.2	25,587.8	25,428.9	26,832.9	27,261.1	27,597.2	9.8	1.2
DOT	19,342.4	18,965.2	18,971.4	17,027.3	19,360.1	19,772.6	18,400.0	19,353.2	19,172.6	18,612.2	-3.8	-2.9
DOJ	8,176.0	6,961.6	8,018.3	7,544.3	9,081.7	10,263.6	10,193.3	12,127.7	11,999.9	15,805.1	93.3	31.7
GSA	17,330.7	14,226.0	13,985.0	13,842.0	14,149.4	13,963.0	13,671.8	14,499.2	14,364.3	14,096.2	-18.7	-1.9
NASA	10,827.9	12,321.8	12,455.4	12,538.8	12,358.7	12,588.3	12,395.3	11,480.6	11,980.3	11,717.1	8.2	-2.2
USDA	8,358.7	9,519.6	9,599.6	9,100.6	9,332.9	9,412.9	9,728.8	9,056.9	7,370.7	7,917.0	-5.3	7.4
ST ¹	246.9	302.6	274.2	273.8	390.2	422.3	437.3	653.3	721.4	7,787.9	3,054.3	979.6
HHS	6,210.5	7,957.0	7,107.1	7,954.7	8,146.3	8,408.3	6,129.7	6,628.9	7,852.8	7,400.8	19.2	-5.8
DOI	7,816.3	7,391.9	7,094.8	6,992.4	7,482.1	7,892.2	6,378.4	4,326.6	6,612.2	6,427.3	-17.8	-2.8
TRSY	2,770.0	3,391.6	4,177.1	4,628.4	4,912.7	4,558.2	4,132.6	3,764.1	4,597.6	4,816.3	73.9	4.8
DOL	2,385.2	2,376.0	2,446.0	2,452.4	2,514.9	2,527.9	2,385.7	2,491.5	2,490.2	2,540.4	6.5	2.0
DOC	2,489.1	4,476.3	2,722.2	2,460.1	2,338.4	2,858.3	2,882.8	2,883.1	2,721.4	2,470.3	-0.8	-9.2
TVA ²	980.9	904.5	961.3	834.4	892.1	2,534.9	2,607.3	2,547.8	2,396.9	2,295.9	134.1	-4.2
EPA	904.5	747.0	822.4	839.7	994.8	1,041.2	1,120.6	1,099.7	1,148.3	1,120.6	23.9	-2.4
HUD	116.9	140.3	164.9	156.7	147.8	144.2	131.3	140.8	137.6	126.4	8.1	-8.1
FCC	23.6	23.9	22.1	19.9	20.2	20.7	20.7	17.5	19.9	19.4	-17.9	-2.5
PCC	724.2	873.1	808.1	923.5	914.9	921.0	1,108.0	1,080.8	1,021.9	0.0	-100.0	-100.0
OTHER*	408.2	2,175.0	1,382.0	1,460.4	1,604.1	1,981.0	2,979.7	3,716.2	3,998.7	3,870.0	848.0	-3.2
CIVILIAN AGENCIES												
TOTAL	194,290.9	191,735.5	189,057.7	190,278.6	197,796.1	202,128.4	203,442.9	203,552.9	200,554.0	205,947.0	6.0	2.7
DOD	1,250,613.8	1,241,655.8	1,269,291.5	1,103,990.1	1,048,772.9	977,040.4	926,022.9	904,150.2	880,007.7	837,115.8	-33.1	-4.9
ALL AGENCIES												
TOTAL	1,444,904.7	1,433,391.3	1,458,349.2	1,294,268.7	1,246,569.0	1,179,168.8	1,129,465.7	1,107,703.1	1,080,561.7	1,043,062.8	-27.8	-3.5
MBOE	248.1	246.1	250.4	222.2	214.0	202.4	193.9	190.2	185.5	179.1		
Petajoules	1,524.3	1,512.2	1,538.5	1,365.4	1,315.1	1,244.0	1,191.5	1,168.6	1,140.0	1,100.4		

DATA AS OF 01/10/00

*Other includes, for certain years, CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FERC.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

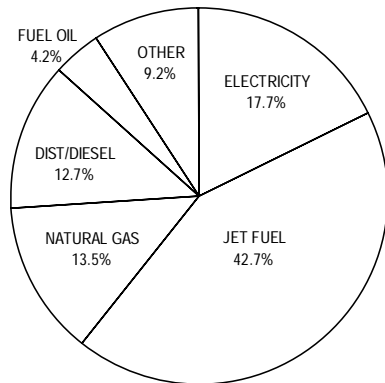
²TVA's increase in energy consumption beginning in FY 1994 is the result of first-time reporting of energy consumed at generation sites.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour and 1,000 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

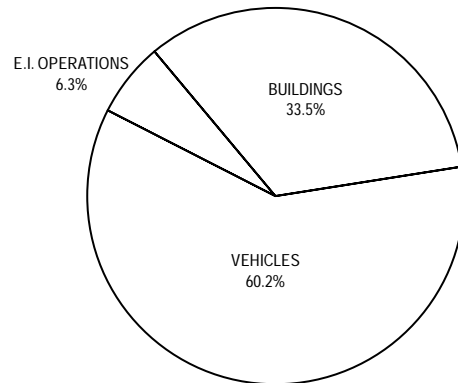
Source: Federal Agency Annual Energy Management Data Reports

FIGURE 1
Federal Energy Consumption, FY 1998

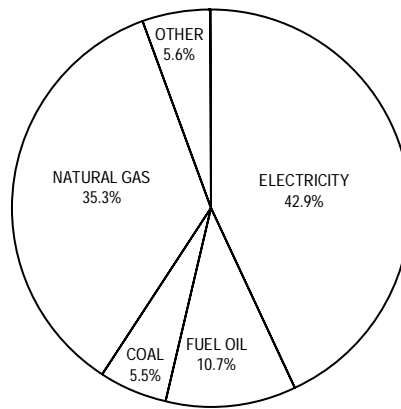
Total by Energy Type: 1.04 quads



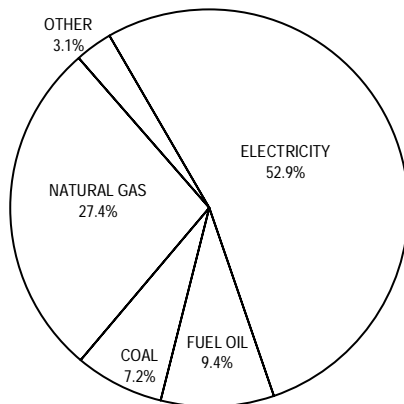
Total by Sector: 1.04 quads



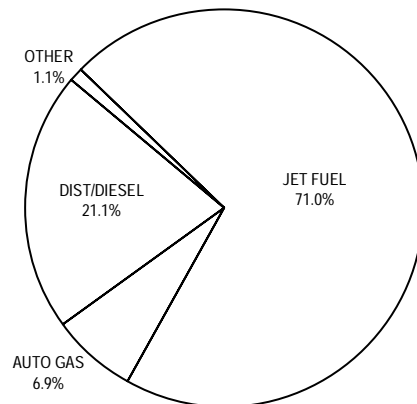
Buildings & Facilities: 0.35 quads



Energy Intensive Operations: 0.07 quads



Vehicles & Equipment: 0.63 quads



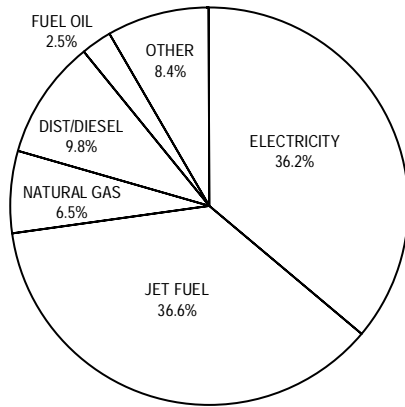
Data as of 01/10/00

Source: Federal Agency Annual Energy Management Data Reports

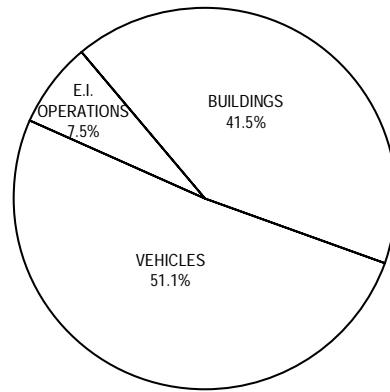
Note: Sum of components may not equal 100 percent due to independent rounding.

FIGURE 2
Federal Energy Costs, FY 1998

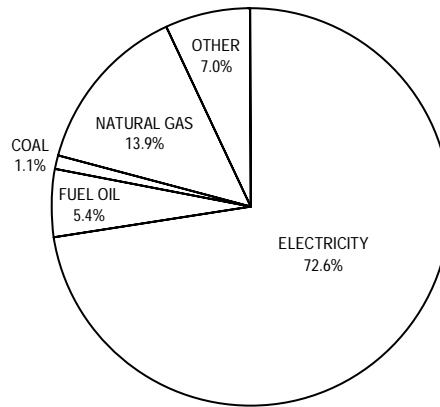
Total by Energy Type: \$8.50 Billion



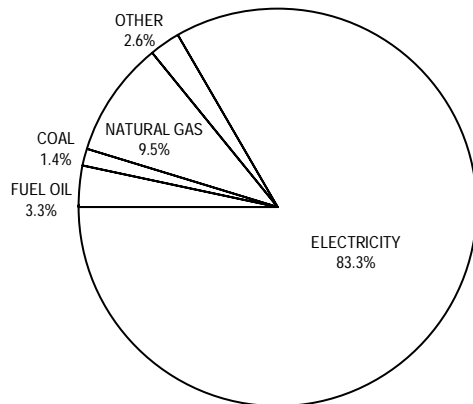
Total by Sector: \$8.50 Billion



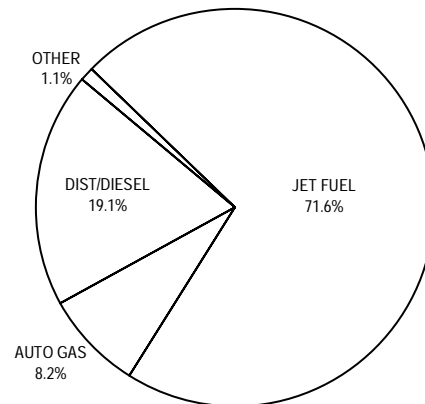
Buildings & Facilities: \$3.53 Billion



Energy Intensive Operations: \$0.62 Billion



Vehicles & Equipment: \$4.35 Billion



Data as of 01/10/00

Source: Federal Agency Annual Energy Management Data Reports

Note: Sum of components may not equal 100 percent due to independent rounding.

TABLE 2
FEDERAL PETROLEUM USAGE IN FY 1998
(in Thousands of Gallons, Billions of Btu,
and Petajoules [Joule x 10¹⁵])

	Unit Total (KGal)	BBTU* DOD	BBTU* Civilian	BBTU* Total	Petajoules* Total
Buildings & Facilities					
Fuel Oil	269,175.7	30,769.4	6,565.2	37,334.7	39.39
LPG/Propane	31,419.9	1,585.1	1,415.5	3,000.6	3.17
Energy Intensive Operations					
Fuel Oil	44,758.0	4,510.5	1,697.5	6,207.9	6.55
LPG/Propane	1,472.4	75.5	65.1	140.6	0.15
Vehicles & Equipment					
Motor Gas	344,403.8	15,326.1	27,724.3	43,050.5	45.42
Dist-Diesel & Petrol.	953,952.9	126,593.8	5,719.5	132,313.3	139.62
Aviation Gas	1,679.5	0.4	209.6	209.9	0.22
Jet Fuel	3,427,079.5	437,760.4	7,760.0	445,520.3	470.01
Navy Special	0.0	0.0	0.0	0.0	0.00
LPG/Propane	4,115.3	74.0	319.0	393.0	0.41
Other	6,242.9	205.1	6,037.8	6,242.9	6.59
Total		616,900.2	57,513.5	674,413.7	711.50

DATA AS OF 01/10/00

*Uses a conversion factor of:

95,500 Btu/gallon for LPG/propane

138,700 Btu/gallon for fuel oil, distillate-diesel & petroleum, and navy special

125,000 Btu/gallon for motor gasoline and aviation gasoline

130,000 Btu/gallon for jet fuel

947.9 Billion Btu/Petajoule

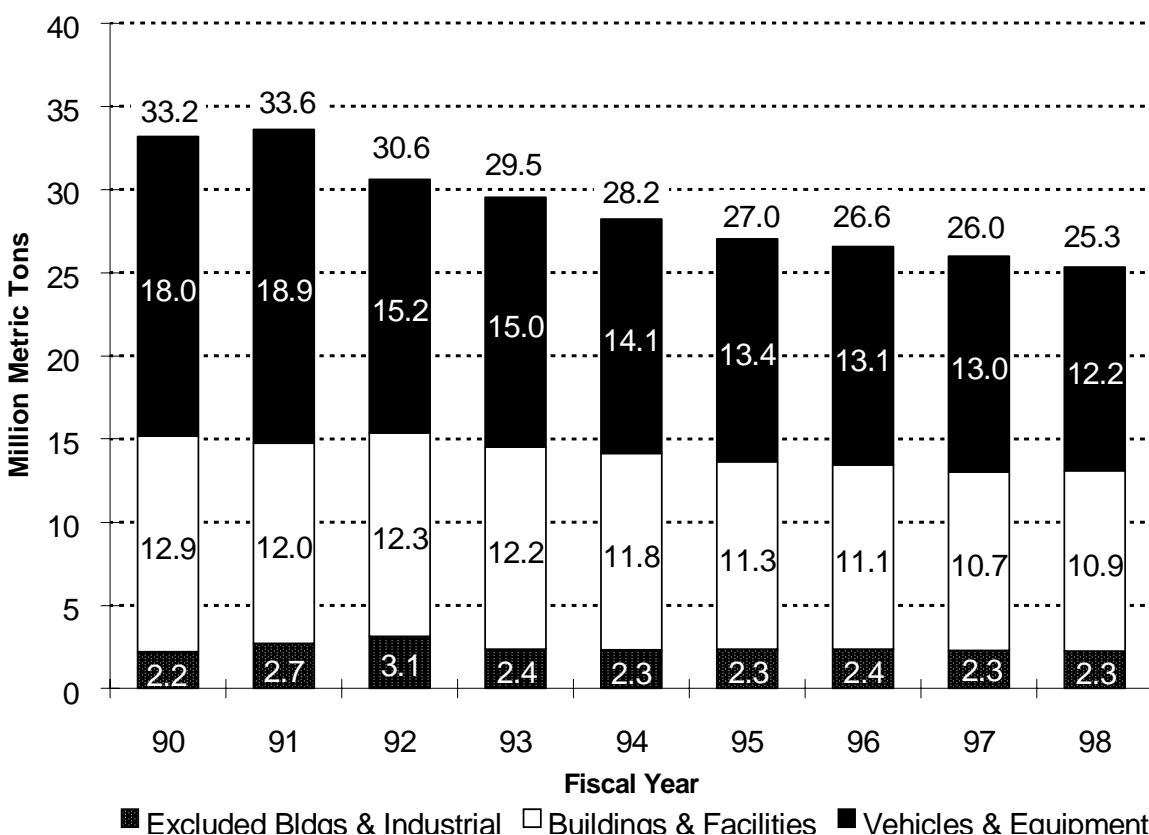
Note: FY 1998 contains estimated data for the following agencies: FEMA, FTC, and OPM.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

Carbon emissions from Federal Government energy consumption have decreased significantly since FY 1990, the base year for the Kyoto Protocol to the United Nations Framework on Climate Change. As shown in Figure 3, the Federal Government has reduced carbon emissions across the three end-use sectors by 23.7 percent from 33.2 million metric tons in FY 1990 to 25.3 million metric tons in FY 1998.¹⁰ The largest contribution to this reduction is from the vehicles and equipment sector, which has seen a decrease in carbon emissions of 32.2 percent. This is a result of a reduction of almost 5.5 million metric tons of carbon emissions from jet fuel, as well as smaller reductions from diesel, aviation gasoline, navy special, and LPG/propane.

Carbon emissions have decreased by 16.2 percent in the buildings and facilities sector since 1990. Contributing to this reduction was a 10.9 percent reduction in gross square footage since FY 1990 and a 5.8 percent decrease in primary energy intensity (246,974 Btu/GSF in FY 1990, 232,752 Btu/GSF in FY 1998). Carbon emissions from energy intensive activities in excluded buildings increased 1.8 percent (47,344.4 metric tons) since FY 1990.

FIGURE 3
Carbon Emissions from Federal Energy Consumption, FY 1990 to FY 1998



¹⁰Carbon emissions were calculated by multiplying energy consumption for each fuel type by an associated carbon coefficient shown in Appendix B. These coefficients are derived from DOE/EIA-0573(98), *Emissions of Greenhouse Gases in the United States, 1998*, October 1999; Tables 11 and B1.

C. Federal Coordination

Federal Interagency Energy Policy Committee (“656” Committee)

The Federal Interagency Energy Policy Committee (“656” Committee) was established in accordance with Section 656 of the Department of Energy Organization Act (P.L. 95-91) to strengthen Government programs that emphasize productivity through the efficient use of energy, and concurrently, to encourage interagency cooperation in energy conservation. In mid FY 1997, the resignation of Christine Ervin, Assistant Secretary for Energy Efficiency and Renewable Energy and Chair for the “656” Committee, in combination with a number of other vacancies in “656” Committee members, led to the postponement of the meeting scheduled for May 14, 1997. The “656” Committee resumed its regular schedule in FY 1998 and convened a meeting on July 28, 1998. The following subjects were discussed:

- President Clinton’s radio address in July 1998, which addressed the role of the Federal Government in tackling climate change. The announcement contained four initiatives related to Federal energy efficiency.
- The OMB memorandum which encourages the retention of savings from energy efficiency projects was discussed.
- The White House Climate Change Task Force, being used to implement energy policy, was described.
- A new, draft Charter was reviewed for the Federal Interagency Energy Policy Committee, which would include a detailed description of the Committee’s role and responsibilities.
- A discussion was held about producing a guidance document regarding alternative financing. The guidance would answer common questions and help facility managers.
- Issues regarding renewable power purchasing were discussed, including White House guidance, GSA and Defense Logistics Agency procurement systems, and the renewable energy market.
- Federal Energy Saver Showcase plaques were presented to 27 Federal facilities.

Federal Interagency Energy Management Task Force

The Interagency Energy Management Task Force was established by section 547 of NECPA, as amended, 42 U.S.C. § 8257. During the four meetings of the Task Force during FY 1998, the following subjects were examined and discussed:

December 16, 1997

- The results of hearings and budget actions were reported.

- An announcement was made about the newly awarded Southeast Super Energy Savings Performance Contract.
- The Climate Change Initiative was discussed at length, emphasizing its importance to FEMP and the necessity for Federal agencies to report their contributions to reduction of carbon emissions using the energy consumption data already being reported by agencies.
- A report was given on the status of the Million Solar Roofs initiative.
- An announcement was made about the amendment of the Federal Acquisition Regulations, to include policy for agencies to implement cost-effective contracting preference programs favoring the acquisition of environmentally preferable and energy-efficient products and services.
- The final versions of two alternative financing guidance memoranda approved by the Alternative Financing Guidance Committee were distributed. The memoranda cover Authority to Sole Source Utility Service Contracts, and Congressional Notification for Utility Projects.
- A presentation was given on the Washington State University Energy Program's Total Efficiency Network, which provides information, training, and support to public and private facilities to help them save money and resources through efficient resource management.

February 4, 1998

- A update was given on the status of the Super Energy Savings Performance Contract, including the announcement about the upcoming awards for the Super ESPC for the Central and Midwest regions.
- A report was given on the Task Force's Utility Restructuring Subcommittee's first meeting. The Subcommittee was formed to address the impact of restructuring of the electric utility industry on the Federal customer. The Task Force unanimously agreed on the Subcommittee continuing its direction.
- A description was given of the proposed language changes to the National Energy Conservation Policy Act to eliminate the FY 2000 sunset provision of the ESPC authority and address other contracting barriers.
- It was reported that an integrated renewable energy strategy is being developed to demonstrate Federal leadership in using cost-effective renewable energy technologies and provide strategic linkages among several programs, including renewable, alternative financing, Million Solar Roofs, FEMP deployment, and global climate change.

- A draft report entitled “*Issues Involved in Instituting Life Cycle Assessment for Federal Energy and Product Purchases*” was distributed. The study concerns the inventory analysis component of LCA—the quantitative assessment of all the energy, materials, resources, and releases associated with the life-cycle of a product or processes, identified at each stage of the life-cycle.
- A presentation was given, entitled “*Federal Energy Management in Buildings: Past and Future Carbon Trends.*”

April 14, 1998

- An update was given on the activities of the Barriers Subcommittee of the Renewable Energy Working Group.
- A brief overview was given on the “You Have the Power” energy awareness campaign.
- A discussion was held regarding the Federal purchase of green power. It was decided that the Deregulation Subcommittee should investigate and make recommendations for a meeting on this issue in Bellevue, Washington as part of the Energy ‘98 trade show, and begin drafting a green power policy statement for 656 Committee approval.
- Draft guidance on choosing alternatives for acquiring private sector energy services was distributed. The guidance was drafted in response to a request from Congress resulting from the testimony of Secretary of Energy Peña on sole-source utility contracting. The Task Force was asked to comment on the guidance and provide their input.
- It was announced that FEMP is looking for sites in the Federal sector that would be good candidates for combined heat and power projects. Sites with the potential for cogeneration and district heating and cooling could receive technical assistance from FEMP in identifying projects.
- An overview of DOE’s Office of Industrial Technologies’ Inventions and Innovations Program was given. This program can provide a list of energy-saving technologies that have been tested by FEMP and are available for sale and/or test sites.

July 15, 1998

- It was reported that the White House Climate Change Task Force has organized several working groups related to energy and requested additional volunteers for the working groups. The topics include: ESPCs; Energy-Efficient Procurement; Lights; Windows; Buildings for the 21st Century; Transportation; and Executive Orders.
- An explanation of the goals of each working group was given, and it was noted that each working group had been charged with producing a summary of Federal Government efforts within their own area.

- Reporting guidance for the FY 1998 Annual Report to Congress was distributed and discussed.

The complete minutes of these meetings are available from the DOE Federal Energy Management Program office.

D. Personnel and Energy Awareness Activities

Training

During FY 1998, DOE's Federal Energy Management Program (FEMP) conducted 49 training workshops and symposia for more than 5,100 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.

FEMP supplemented its classroom workshops with "distance learning" training, via satellite. The Energy Management Teleworkshop, a 10-module survey of FEMP courses, attracted 2,400 viewers; the Utility Financing and the Utility Deregulation Impacts teleworkshops attracted 350 students each.

Eight workshops on energy savings performance contracting (ESPC) were conducted in FY 1998 for 241 participants. In each workshop, facility managers, contract specialists, and building engineers were instructed on the statutory provisions for this innovative contracting/financial method, and how to identify suitable projects. ESPC allows energy-efficient improvements to be installed by private contractors with no up-front capital costs.

The Designing Low Energy Buildings course was presented twice for 34 participants. The two-day course included analyses and case studies of building design using passive solar heating, natural ventilation and cooling, and day lighting, as well as glazing and overhangs.

The new FEMP Lights course was conducted twice for a total of 46 participants. The objective was to provide guidance on energy-efficient lighting consistent with other facility lighting considerations, quality and cost, and whole building analysis. Topics included: basic lighting concepts; a comprehensive process for Federal relighting project development and implementation; and the use of professional lighting design services.

Two Facility Energy Decision Screening (FEDS) workshops were held during FY 1998 for 30 attendees. This is a training course for Federal facility managers on whole-site analysis of energy conservation, technical, and financial opportunities utilizing the FEDS-Level 1 project screening software and the FEDS-Level 2 project implementation software.

The new FEMP Motor Training course, based on "Motor Master" software for buildings, was presented twice for 20 students.

Operations and Maintenance Management was presented once for 17 students.

FEMP, in conjunction with the National Institute of Standards and Technology, conducted two workshops on life-cycle costing and building retrofit simulation for 73 students. The new Buying Energy-Efficient Products course was presented once for eight students.

The Implementing Renewable Energy Projects course was presented twice for 60 students.

FEMP continued to offer its Water Resource Management course with one workshop for eight attendees in FY 1998. The course is designed to assist Federal site managers and agencies in meeting the water conservation requirements of Energy Policy Act of 1992 (EPACT) and Executive Order 12902.

During FY 1998, FEMP participated in the organization and presentation of 20 panel discussions on Federal energy efficiency, water conservation, and renewable energy topics at national energy management conferences around the country, attracting 1,485 attendees.

The Federal Energy Management Program continued to offer its Training Course Locator System to assist Federal agencies in training energy managers and in meeting the requirements of the EPACT. The Locator System connects those seeking particular training courses with the sponsoring organization for those courses by responding to numerous requests from Federal energy managers, utility managers, engineers, building operators, and facility personnel.

Recognition

Outstanding accomplishments in energy efficiency and water conservation in the Federal sector were recognized with the presentation of the 1998 Federal Energy and Water Management Awards on October 28, 1998, at the National Press Club in Washington, D.C. The Awards Program is sponsored by the "656" Committee and the Department of Energy. Awards were selected from outstanding Federal energy managers and contributors who:

- Implemented proven energy efficiency, energy and water conservation techniques;
- Developed and implemented energy-related training programs and employee energy awareness programs;
- Succeeded in receiving utility incentives, or awarding ESPC and other Federal-approved performance-based energy and water contracts;
- Made successful efforts to fulfill compliance with energy and water reduction mandates;
- Improved energy efficiency or reduction in energy costs for Federal mobile equipment including aircrafts, ships, and vehicles;
- Improved tracking of energy consumption, costs and energy efficient investments;
- Provided leadership in purchasing or supplying energy-efficient, renewable energy or water-conserving products to one or more Federal agencies; and
- Demonstrated cost-beneficial landscape practices which utilize techniques that seek to minimize the adverse effects of landscaping.

Recipients of the 1998 awards were selected from 188 nominees submitted by 17 Federal agencies. Award recipients totaled 49, representing 16 different Federal agencies. Distribution of awards among the Federal agencies for accomplishments in FY 1997 is indicated below. Awards were presented to agencies in the categories shown in the exhibit below:

Agency	Individual	Small Group	Organization	Total	Energy Efficiency	Alternative Financing	Renewable Energy	Mobility	Water Mgmt.	Exceptional Service
DOD	1			1						1
Army	3		1	4	2		1			1
Navy			9	9	5	1	3			
USAF	1		7	8	4	2		1		1
USMC			1	1	1					
DOE	2	3	2	7	4		1			2
DOI	2	1		3			1	1	1	
DOJ	1			1						1
DOT	1			1						1
GSA		3	1	4	2	2				
HHS	1			1						1
NASA	1			1						1
USDA	1	1	1	3	2					1
USPS	2	1		3	2					1
DOC		1		1		1				
State		1		1	1					
TOTAL	15	11	23	49	23	6	6	2	1	11

Each category contained a wide variety of projects. Examples from each award category follow.

Energy Efficiency Award to Organization:

Pacific Rim Region 9 Property Management Division, General Services Administration, San Francisco, California. The efforts at the Prince Jonah Kuhio Kalanianaʻole Federal Building and Courthouse in Hawaii utilized cutting edge technologies and high efficiency and productivity practices in upgrading the central cooling plant at this facility. The project required the replacement of two R-12, 1,000-ton centrifugal chillers and two R-11, 60-ton reciprocal chillers along with the associated pumps, motors, cooling towers, and controls. Initial project funds were cut by 50 percent due to pay for security upgrades in the wake of the Oklahoma City bombing, but an alliance with Hawaiian Electric Company enabled the project to go forward. The new plant consists of two 950-ton R-123 centrifugal chillers, one 200-ton centrifugal chiller, and a 60-ton reciprocal R-22 chiller for emergency use. For the 10 month period starting June 1997 through March 1998, GSA saved 1.6 billion kilowatt hours or 5.6 billion Btu, a cost savings of \$177,628. After deducting the finance repayment costs, there was a net savings of \$67,598.

Energy Efficiency Award to Small Group:

William G. Jackson, Leslie Fish, Donald E. Garvin, William E. Watkins, Portland District, United States Postal Service, Portland, Oregon. The Portland District Energy Team has a remarkable track record, completing 167 energy saving projects from FY 1992 through FY 1997. Fifty-one of these projects were completed in FY 1997, saving 2.9 million kilowatt hours. The annual energy cost savings for the 51 projects completed during FY 1997 is almost \$138,000. The total first year energy cost savings for all 167 projects is \$734,966. The Energy Team has completed energy conservation projects on approximately 88 percent of their facility inventory.

Energy Efficiency Award to Individual:

Morgan Benson, 26th Area Support Group, Department of the Army, Heidelberg, Germany. The 26th Area Support Group (ASG) manages the 293rd, 411th, and 415th Base Support Battalions (BSBs) facilities in the U.S. Army Europe. While working in support of these facilities, Mr. Benson instituted a strong energy conservation program where none had previously existed. In FY 1996, two of the three Energy Conservation Investment Program (ECIP) projects submitted by Mr. Benson became the first-ever ECIP projects funded in Europe. In FY 1997 alone, the 26th ASG reduced its energy consumption by 11 percent. Today, one ECIP project is complete, three are under construction, two are under design, and several are planned. As a direct result of Mr. Benson's efforts, the 26th ASG has achieved annual savings of more than 48.7 billion Btu and avoided costs of \$634,800. The success of the 26th ASG program has been achieved despite considerable mission-related activities.

Energy Savings Performance Contracting Award:

United States Air Force, Little Rock Air Force Base, Arkansas. Little Rock Air Force Base partnered with its providing utility, Energy Arkansas Inc., to design and install 1,535 geothermal ground source heat pumps in military family housing. The \$10 million project is the single largest demand side management effort ever undertaken in the Department of Defense. The process reduced the procurement cycle time and allowed Little Rock Air Force Base to execute needed infrastructure repair with no up-front capital investment. The project will result in an annual energy and maintenance savings in FY 1997 of more than \$1 million and a nearly 16 percent reduction in the Base's annual electricity usage. The ground source heat pump units

were equipped with a de-superheater and attached to the hot water heaters. The de-superheater will supplement the heated water in the hot water heater while the new heat pump is running, thereby utilizing waste heat.

Renewable Energy Award:

Ivan D. Miller, Daniel W. Kreiber, David N. Ha, Paul J. LaValley, Frank Smith, Department of the Interior, National Park Service, Omaha, Nebraska. The team effort of the Sleeping Bear Dunes National Lakeshore and the National Park Service Midwest Support Office resulted in implementing a sustainable power system that provides solar energy to North Manitou Island in Lake Michigan. This photovoltaic hybrid system replaced inefficient diesel generators and propane tanks. This new solar-powered system, complete with a battery bank for energy storage and backup diesel generators, has realized significant energy and environmental benefits including eliminating potential fuel spills, controlling air pollution emissions, and decreasing dependency on fossil fuels required to support the basic needs on the island. Solar power now supplies nearly all the electrical energy necessary for the island village from May through Labor Day, and approximately 90 percent of the energy for the entire year. The equipment investment for the North Manitou Island system was approximately \$190,000. The present value, on a 20-year life-cycle cost for the hybrid system, is approximately \$296,000.

Mobility Energy Management Award:

USS MOBILE BAY (CG-53), Department of the Navy. USS Mobile Bay continued strict adherence to their Energy Conservation Program during FY 1997. This program, the crew's high level of energy awareness, and good engineering practices have all enabled Mobile Bay to achieve fuel savings of \$2.7 million over a three year period, with \$1.4 million in fuel cost savings in FY 1997. One of the activities responsible to this achievement is compliance with the trail shaft program while operating below 18 knots. This practice has cut fuel consumption between 30 and 45 percent. This translates to a fuel reduction of more than 325 gallons per hour, and more than 7,800 gallons per day. For FY 1997, 30,000 fewer barrels of fuel were consumed.

Water Management Award:

Central Federal Lands Highway Division and Coronado National Forest, Department of Transportation, Lakewood, Colorado, and U.S. Department of Agriculture, Tucson, Arizona. The Central Federal Lands Highway Division in cooperation with the Coronado National Forest has completed the fifth phase of reconstruction of the Hitchcock Highway, which runs 25 miles from Tucson, Arizona, to the top of the Santa Catalina Mountains. The intent of the project's landscaping practices was to integrate visual goals with safety and maintenance goals, and to ensure cost effectiveness of mitigation measures. Specialized blasting, staggered ridges and slopes; a four-prong revegetation approach using native plants; and a gravity-operated, drip irrigation system were all utilized. Cost benefits will result from reduced maintenance due to the use of natural rock fractures in blasting; using native plants with a high rate of survival; and the use of the low flow drip emitters, which provide a deep soak with a minimal water requirement.

Exceptional Service Award:

Phyllis E. Johnson, Agricultural Research Service, Department of Agriculture, Beltsville, Maryland. As Beltsville Area Director, Dr. Johnson provided support to the Beltsville Agricultural Research Center (BARC) in its energy awareness and conservation programs. Dr.

Johnson was instrumental in the signing of an energy savings agreement with Washington Gas and Light Company, resulting in the installation of natural gas lines to the entire facility, eliminating the use of heating oil. Washington Gas and Light will pay the initial \$700,000 project cost. She also helped develop a state-of-the-art compost facility, eliminating the inflow of nitrogen and phosphorous to the Chesapeake Bay, resulting in a cost savings in excess of \$70,000 annually. The building consolidation program has resulted in savings of approximately \$200,000 per year in maintenance and utility costs. The Agricultural Research Center applied for Potomac Electric Power Company energy conservation rebates and recovered significant amounts on equipment, saving approximately \$70,000. The newly-constructed west side recycled water tank system will store effluent from the waste water treatment facility. The water will then be used for steam production, saving \$40,000 each year.

Energy Awareness

The Federal Government, as the largest single employer in the United States, has the responsibility to set an example for the nation by conducting energy awareness programs. Most agencies have ridesharing, carpooling, and/or public transportation programs in effect. Many agencies also participate in recycling programs. The following exhibit shows the employee awareness activities at the various Federal agencies.

Agency	Award Programs	Recycling	Ridesharing	Transit Subsidies	Information Dissemination
USDA	✓	✓	✓		✓
DOC	✓	✓	✓		
DOD	✓	✓	✓	✓	✓
DOE	✓	✓	✓	✓	✓
HHS	✓	✓			
HUD	✓	✓	✓	✓	
DOI	✓	✓	✓	✓	✓
DOJ	✓	✓	✓		✓
DOL	✓	✓	✓	✓	
ST		✓	✓		
DOT	✓	✓	✓	✓	✓
TRSY		✓	✓	✓	✓
VA		✓			
EPA	✓	✓	✓	✓	✓
GSA	✓	✓	✓		
NASA	✓	✓	✓	✓	✓
NARA	✓				
NRC		✓	✓	✓	✓
PCC					✓
RRB		✓		✓	
SSA	✓	✓			
TVA		✓	✓		✓
USPS	✓	✓	✓	✓	✓

Federal Energy Saver Showcase Facilities

Section 307 of Executive Order 12902 requires that each agency which constructs at least five buildings in a year shall designate at least one building, at the earliest stage of development, to be a showcase highlighting advanced technologies and practices for energy efficiency, water conservation, or use of solar and other renewable energy. Furthermore, it requires that the agencies attempt to incorporate cogeneration, solar and other renewable energy technologies, and indoor air quality improvements. Selection of such buildings is based on considerations such as the level of non-Federal visitors, historical significance, and the likelihood that visitors will learn from the demonstration and initiate similar projects. The Order charges each agency to develop and implement plans in cooperation with DOE and, where appropriate, in consultation with the General Services Administration, the Environmental Protection Agency, and other appropriate agencies to determine strategies to implement these demonstrations.

There were no showcase facilities designated in FY 1998. The showcase facilities designated in FY 1997 featured a wide variety of approaches and technologies at widely disparate Federal sites. Although many showcase projects carry out conventional energy saving measures, some also feature cutting-edge technologies. For example, GSA is partnering with their servicing utility and DOE to illuminate the exterior of the Alexander Hamilton Customs House with a sulfur lamp. The Department of Defense has designated three phosphoric fuel cell power plants as showcases. To date, these projects have saved the DOD nearly \$250,000, and have proven that fuel cells are a highly efficient, environmentally clean, and cost effective method of electricity generation. By installing this technology, DOD has taken the lead in increasing fuel cell use across the United States.

Twenty percent of the showcases have chosen geothermal technology to heat and cool their buildings. This technology is becoming more popular within the Federal sector, and is providing significantly lower utility bills to the energy managers at the Department of the Interior and the Department of Energy. No pollutants are added to the environment by these systems, and during their 20-year equipment life, geothermal heat pump systems save energy, dollars, and reduce emissions at a rate significantly lower than comparable heating and cooling systems.

Renewable energy technologies are also prominent. The Environmental Protection Agency's Ada and Narragansett Laboratories are integrating solar water heating technology. The passive solar design used in the Department of the Interior's Prairie Learning Center will save the Fish and Wildlife Service facility more than 400,000 kilowatt hours and \$17,000 in annual energy consumption.

E. Funding for Energy Efficiency in Buildings and Facilities

During FY 1998, Federal agencies had three primary options for financing energy efficiency, water conservation, and renewable energy projects in buildings and facilities: direct appropriated funding, energy savings performance (ESP) contracts, and utility-sponsored demand side management (DSM) incentives. The latter two options utilize non-Government sources of funding and can be used to supplement Government funding. Each of these three sources can be combined with another. Formerly, the DOE's Federal Energy Efficiency Fund grant program was a fourth option available to agencies for funding projects; however, there were no appropriations for the Fund in FY 1998.

To the extent that agencies have been able to provide complete reporting, funding from the three sources totaled approximately \$377 million in FY 1998.

Direct Appropriations

The National Energy Conservation Policy Act requires each agency, in support of the President's annual budget request to Congress, to specifically set forth and identify funds requested for energy conservation measures. Table 3-A presents agency funding (in nominal dollars) reported from FY 1985 through FY 1998 for energy conservation retrofits and capital equipment. Table 3-B presents the same information in constant 1998 dollars. In constant dollars, funding for energy conservation declined from \$371.0 million in FY 1985 to a low of \$65.6 million in FY 1989. Reports from Federal agencies indicated that \$261.3 million was spent on retrofit expenditures in FY 1998, compared with \$202.5 million in FY 1997. In some cases, the data provided by the agencies include funding from operation and maintenance accounts that was specifically identified as contributing to energy efficiency. Figure 4 illustrates agency spending trends for the five largest energy-consuming agencies and the remaining group of Federal agencies.

The Defense Department funded \$191.4 million in expenditures for energy efficiency projects in FY 1998, \$71.3 million more than the previous year.

No direct funding was appropriated for the Department of Energy in FY 1998 for retrofit projects in buildings and metered process facilities. The General Services Administration also received no appropriations for energy efficiency projects in FY 1998.

Table 3-A
Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,
FY 1985 through FY 1998 (Thousands of Nominal Dollars)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Projected 1999
DOC	0	0	0	0	0	0	0	872	0	51	0	0	NA	330	1,015
DOD	136,100	120,000	5,550	5,280	1,500	1,020	10,000	49,669	14,444	109,000	189,600	112,487	118,970	191,446	203,806
DOE	14,800	14,500	16,500	18,900	19,400	19,500	20,400	20,650	20,950	24,850	30,200	0	0	0	0
DOI	3,198	5,535	0	0	4,338	0	1,272	9,800	4,859	1,662	779	891	0	160	176
DOJ	0	0	0	195	484	6,100	26,400	0	N/A	1,284	994	1,559	2,091	1,500	1,700
DOL	238	31	106	142	584	17	35	16	0	0	N/A	366	0	0	0
DOT	13,650	15,000	12,104	12,700	2,908	0	460	143	593	5,970	3,793	2,585	3,176	3,000	3,000
EPA	0	0	0	0	0	0	0	0	500	0	1,720	1,600	1,600	0	0
GSA	6,700	6,100	2,900	9,400	4,868	11,125	30,123	37,000	30,000	37,000	7,242	7,400	20,000	0	1,860
HHS	0	0	0	427	427	427	427	0	1,813	1,915	1,271	2,676	2,879	2,200	3,295
HUD	0	0	0	0	0	0	0	0	43	30	43	0	2,418	0	0
NASA	11,800	12,100	1,700	1,400	4,499	2,943	7,556	7,086	25,072	24,658	20,666	30,266	15,919	13,813	13,695
PCC	1,274	73	1,174	600	378	361	807	249	500	608	14	23	3	104	0
RRB	0	0	0	0	0	0	0	0	16	13	33	0	38	23	0
STATE	0	0	0	0	0	0	0	0	0	67	0	0	1,902	51	0
TRSY	0	0	2,977	2,393	2,823	1,134	836	0	1,344	4,826	2,810	170	2,990	1,400	300
TVA	0	0	0	0	0	0	0	0	475	844	4,277	522	1,158	1,466	700
USDA	2,500	0	0	500	500	1,547	1,752	7,300	7,045	7,277	2,894	5,983	3,891	1,765	0
USPS	55,300	9,300	5,100	3,800	4,000	4,000	4,000	2,293	1,116	1,123	10,050	9,000	16,000	31,000	30,000
VA	13,000	11,500	9,500	9,860	5,500	11,200	9,970	10,000	12,100	9,050	11,960	3,700	7,400	13,000	15,000
Total	258,560	194,139	57,611	65,597	52,209	59,374	114,038	145,078	120,870	230,228	288,346	179,228	200,435	261,258	274,547

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports

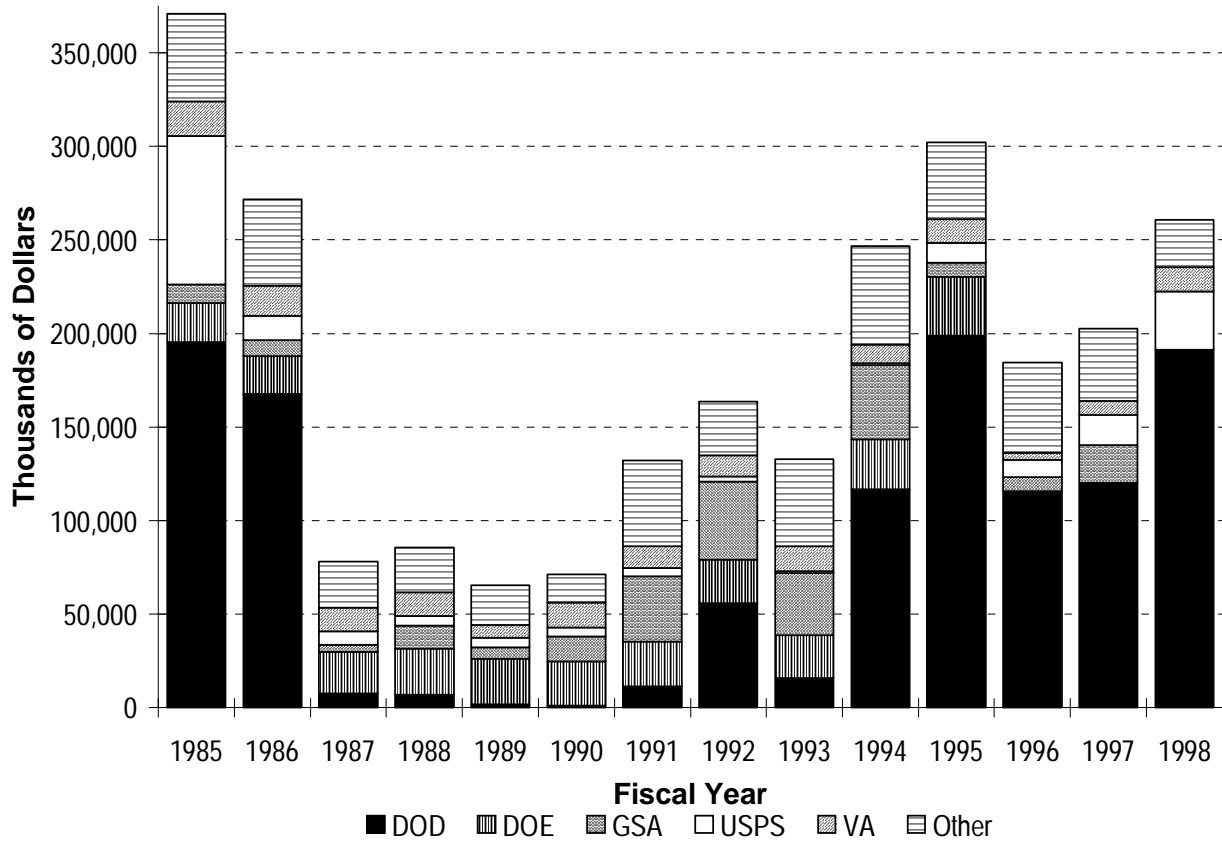
Table 3-B
Agency Expenditures for Energy Conservation Retrofits and Capital Equipment,
FY 1985 through FY 1998 (Thousands of Constant 1998 Dollars)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Projected 1999
DOC	0	0	0	0	0	0	0	983	0	55	0	0	0	330	1,005
DOD	195,265	167,832	7,531	6,911	1,884	1,227	11,587	55,997	15,873	116,827	198,742	115,727	120,172	191,446	201,788
DOE	21,234	20,280	22,388	24,738	24,372	23,466	23,638	23,281	23,022	26,635	31,656	0	0	0	0
DOI	4,588	7,741	0	0	5,450	0	1,474	11,048	5,340	1,781	817	917	0	160	174
DOJ	0	0	0	255	608	7,341	30,591	0	0	1,376	1,042	1,604	2,112	1,500	1,683
DOL	341	43	144	186	734	20	41	18	0	0	0	377	0	0	0
DOT	19,584	20,979	16,423	16,623	3,653	0	533	161	651	6,399	3,976	2,659	3,208	3,000	2,970
EPA	0	0	0	0	0	0	0	0	549	0	1,803	1,646	1,616	0	0
GSA	9,613	8,531	3,935	12,304	6,116	13,387	34,905	41,714	32,967	39,657	7,591	7,613	20,202	0	1,842
HHS	0	0	0	559	536	514	495	0	1,992	2,053	1,332	2,753	2,908	2,200	3,262
HUD	0	0	0	0	0	0	0	0	47	32	45	0	2,442	0	0
NASA	16,930	16,923	2,307	1,832	5,652	3,542	8,756	7,989	27,552	26,429	21,662	31,138	16,080	13,813	13,559
PCC	1,828	102	1,593	785	475	434	935	281	549	652	15	24	3	104	0
RRB	0	0	0	0	0	0	0	0	18	14	35	0	38	23	0
STATE	0	0	0	0	0	0	0	0	0	72	0	0	1,921	51	0
TRSY	0	0	4,039	3,132	3,546	1,365	969	0	1,477	5,173	2,945	175	3,020	1,400	297
TVA	0	0	0	0	0	0	0	0	522	905	4,483	537	1,170	1,466	693
USDA	3,587	0	0	654	628	1,862	2,030	8,230	7,742	7,800	3,034	6,155	3,930	1,765	0
USPS	79,340	13,007	6,920	4,974	5,025	4,813	4,635	2,585	1,227	1,204	10,535	9,259	16,162	31,000	29,703
VA	18,651	16,084	12,890	12,906	6,910	13,478	11,553	11,274	13,297	9,700	12,537	3,807	7,475	13,000	14,851
Total	370,961	271,523	78,170	85,860	65,589	71,449	132,141	163,560	132,825	246,761	302,249	184,391	202,459	261,258	271,829

Notes: **Bold** indicates top five energy users in buildings and facilities (DOD, DOE, VA, USPS, GSA). In past years, DOE also included funds for energy surveys. Does not include energy savings performance contracts and utility demand side management incentives.

Source: Federal Agency Annual Energy Management Data Reports

FIGURE 4
Energy Conservation Retrofit Expenditures
(In Constant 1998 Dollars)



Source: Federal Agency Annual Energy Management Data Reports

Federal Energy Efficiency Fund

The Federal Energy Efficiency Fund (Fund) was established by section 152 of EPACT, which amended section 546 of NECPA, to provide grants to agencies to assist them in meeting the mandated energy efficiency and water conservation requirements. The limited spending authority available in FY 1994 and FY 1995 was applied to those proposals which were most competitive, considering the five following factors:

1. The cost-effectiveness of the project (saving-to-investment ratio).
2. The net dollar cost savings to the Federal Government.
3. The amount of energy savings to the Federal Government.
4. The amount of funding committed by the agency requesting financial assistance.
5. The amount of funding leveraged from non-Federal sources.

No spending authority has been provided beyond FY 1995. A total of 114 proposals were received during FY 1994 and FY 1995 and Fund grants were provided for 37 projects. Of these, 35 projects provide energy savings of 5.8 trillion Btu and two projects result in water conservation in the amount of 738 million cubic feet, with an estimated energy and water cost savings of \$54 million (before payback of the initial investment) over the useful lives of the projects. The total Fund investment to realize these savings was \$7.9 million, which leveraged \$3.6 million in Federal-agency funding and \$0.9 million in non-Federal funding. The projects encompass 14 states and the District of Columbia, with one project located in the Caribbean. A summary of the funded projects is shown on the next page.

EPACT, 42 U.S.C. § 8258, requires energy and cost savings to be reported annually after completion of construction, for each project funded under the Federal Energy Efficiency Fund. Of the 37 funded projects, 25 are complete and operational, realizing annual energy and cost savings which equal or exceed the values projected in the original proposals for Fund grants. Six energy efficient lighting projects, two water projects, and one each HVAC, chiller, and natural gas conversion projects remain under construction for completion by the end of FY 1998. These projects have been integrated into other non-Fund building upgrades funded by the respective agencies, resulting in longer time periods required for completion. In some cases, mission requirements have also limited building access.

Three Federal Energy Efficiency Fund projects will each put in place one base-wide energy savings performance contract (ESPC) for the U.S. Coast Guard in Honolulu, HI, and the National Park Service for the Presidio of San Francisco, CA, and two ESPCs will be put in place for the U.S. Army at Fort Huachuca, AZ. One of the Fort Huachuca projects and the U.S. Coast Guard project will install renewable energy solar hot water systems.

Federal Energy Efficiency Fund Projects - FY 1998 Status

Agency	State	Project Description	Funds Awarded	Installation Status (Percent Complete)
DOC - NOAA	WA	NW Fish Science Center - Fish Culture System	\$471,399	98%
DOD - US Army	AZ	Solar and Base-wide Upgrades	\$310,000	15%
DOI - National Park Service	UT	Dangling Rope Marina - PV System	\$350,000	100%
DOI - National Park Service	DC	White House - Transformer & NPS Detailee	\$74,000	100%
DOI - National Park Service	WY	Yellowstone NP - Lighting, Heat, & Insulation	\$455,665	100%
DOI - National Park Service	WY	Yellowstone NP - Phase 2 Lighting, Heat, & Insulation	\$174,500	95%
DOI - National Park Service	CA	Channel Island Santa Rosa Island - Wind & PV System	\$272,394	95%
DOI - National Park Service	CA	Yosemite National Park - Lighting Retrofit	\$73,621	80%
DOI - National Park Service	CA	Golden Gate NRA, Presidio - Lighting Retrofit	\$175,000	50%
DOL - Job Corps Center	MT	Electric to Natural Gas Conversion	\$225,000	100%
DOT - FAA	OH	Lighting Retrofit	\$103,706	100%
DOT - Coast Guard	AK	Used Oil Processing Facility	\$530,000	100%
DOT - Coast Guard	MD	USCG Yard, Lighting Retrofit	\$80,671	100%
DOT - Coast Guard	HI	Housing Area - Solar Water Heating	\$100,000	22%
Treasury - US Mint	PA	Lighting Retrofit	\$103,180	100%
Exec. Residence Agency	DC	White House - Lighting Retrofit & Refrigerator	\$50,477	100%
HHS - NIH/National Cancer Inst.	MD	Chiller Installation	\$283,463	56%
HHS - NIH/National Cancer Inst.	MD	Occupancy Sensor Installation	\$129,090	7%
NASA - Dryden	CA	Edwards AFB Bldg #4800 Lighting Retrofit	\$265,414	100%
NASA - Goddard	MD	Bldg's #17, 21, 22, & 23 Lighting Retrofit	\$286,715	100%
NASA - Goddard	MD	E-Building Complex Lighting Retrofit	\$94,812	100%
NASA - Kennedy	FL	Bldg M7-505 Lighting Retrofit	\$144,500	100%
NASA - Kennedy	FL	Bldg M6-336 Lighting & HVAC Retrofits	\$41,800	100%
NASA - Kennedy	FL	Bldgs M6-339 & M7-581 Lighting Retrofit	\$36,942	100%
NASA - Kennedy	FL	Hanger L, Bldg 1732 Lighting & HVAC Mods	\$88,900	100%
NASA - Kennedy	FL	Launch Complex 39 Lighting Retrofit	\$106,050	100%
NASA - Marshall	AL	Bldg. 4610 Lighting Modifications	\$120,000	91%
NASA - Marshall	AL	Building 4250 Water Conservation	\$116,500	91%
National Gallery of Art	DC	HVAC Automation System	\$2,000,000	95%
Smithsonian Institution	MD	Support Center - Phases 3, 4, & 5 Lighting	\$100,000	100%
Agency for Int'l Development	Jamaica	Executive Office Bldg - Lighting & Windows	\$69,798	100%
USDA - Agric. Research Service	MD	Bldg 011A - Fluorescent Lamp Retrofit	\$3,640	100%
USDA - Agric. Research Service	MD	Bldg 011A - Lighting Occupancy Sensors	\$33,326	100%
USDA - Forest Service	AZ	Apache-Sitgreaves NF Lighting Retrofit	\$35,000	100%
USDA - Forest Service	AZ	Kaibab NF - Replace Telephone Switch	\$66,500	100%
USDA - Forest Service	CA	Shasta-Trinity NF - NCSC Lighting Retrofit	\$28,500	100%
US Soldiers & Airmen's Home	DC	Lighting Retrofit	\$274,677	100%

Energy Savings Performance Contracting

Section 155 of EPACT amended Title VIII of NECPA, sections 801 and 804, relating to energy savings contracts. Section 801, as amended, gives agencies the authority to enter into energy savings performance contracts (ESPCs) and describes the methodology of contract implementation. The ESPC program was created to provide agencies with a quick and cost-effective way to increase the energy efficiency of Federal buildings. Under an ESPC, a private sector energy service company (ESCO) will assume the capital costs of installing energy and water conservation equipment and renewable energy systems. The ESCO guarantees the agency a fixed amount of energy cost savings throughout the life of the contract and is paid directly from those cost savings. Agencies retain the remainder of the energy cost savings.

On April 10, 1995, DOE published in the *Federal Register* (10 CFR Part 436) a final rule that sets forth the regulations for energy savings performance contracting and achieved the directive to substitute regulations for certain provisions in the FAR. On April 18, 1995, DOE published a correction that changed the effective date of the final rule from May 10 to April 10, 1995.

An application process for a Qualified List of ESCOs was also released with the ESPC regulations. Only firms on the Qualified List may receive an ESPC award. Firms that wish to be on the Qualified List must submit an application to DOE and possess the required experience and expertise. The List is continually updated.

On November 2, 1998, the Energy Conservation Reauthorization Act was signed by the President to become Public Law 105-388. The law makes several significant changes to EPACT and NECPA. Section 4 of Public Law 105-388 amends NECPA section 801 to extend the authority of Federal agencies to enter into ESPCs through September 30, 2003. Without this amendment, the authority would have expired on April 10, 2000. Section 4 also amends the definition of "Federal agency" in NECPA Section 804 to include each authority of the U.S. Government, whether or not it is within or subject to review by another agency. During the reauthorization process, the House Committee on Commerce reported that ESPCs have "tremendous potential to produce significant energy savings at Federal facilities," utilizing the resources and capital of private industry.

Inherent to implementation of the ESPC regulation is the necessity for action by senior agency officials, agency priority on employing ESPCs, development and maintenance of trained and dedicated procurement personnel, and accountability for results.

During FY 1998, 35 conventional ESPCs were awarded that, in total, are worth at least \$79 million, providing the Government with an opportunity to save millions of dollars in energy costs during the life of the contracts. These ESPCs include eight by the U.S. Postal Service, two each by the Department of the Treasury, the Department of Transportation, and the National Aeronautic and Space Administration, and one each by the Department of Energy, Department of State, and the Environmental Protection Agency.

**Conventional Energy Savings Performance Contracts Awarded
by Civilian Agencies in FY 1998**

Project Name/Location	Project Description	Contractor Investment or Contract Value	Savings
Dept. of Energy, Savannah River Operations Office, Aiken, South Carolina	Lighting retrofits, HVAC, variable frequency drives, energy-efficient motors, and energy management and control system	Contractor investment for 1st task order is estimated at \$1.8M	1st year savings estimated at \$291,648
Dept. of State, Office of Foreign Buildings Operations, Mexico City, Mexico	Lighting and HVAC retrofits	Contract value is \$593,557	Expected annual savings are \$67,000
Dept. of Transportation, Research and Special Programs Administration, Cambridge, Massachusetts	Lighting retrofit and energy management system	TBD	TBD
Dept. of Transportation, U.S. Coast Guard, USCG Academy, New London, Connecticut	Comprehensive energy improvements	TBD	TBD
Dept. of the Treasury, U.S. Mint, Denver, Colorado and San Francisco, California	Lighting retrofits, chiller replacements, HVAC upgrades, and compressed air system upgrades	Total contract value of the two ESPCs is \$1.688M	Anticipated annual savings of \$192,300 and 1,474 megawatt-hours
EPA, National Vehicle and Fuel Emissions Laboratory, Ann Arbor, Michigan	HVAC retrofit, heating and cooling plant upgrade, energy management and control system, efficient motors, 200kW fuel cell	Contract value is more than \$21M	Energy consumption will be reduced by 66%, energy costs by 74%, water consumption by 15%
NASA, Goddard Space Flight Center, Greenbelt, Maryland; and Wallops Flight Facility, Wallops Island, Virginia	Lighting retrofits, LED exit signs, and other technologies	Two IDIQ contracts with a maximum value of \$5M each	TBD
USPS, Louisville, Kentucky	Comprehensive energy improvements	\$750,000 investment in 5 facilities	Annual savings of \$100,000
USPS, Eastern Shore, Maryland	Comprehensive energy improvements	\$10.8M investment in 111 facilities	TBD
USPS, Baltimore, Maryland	Comprehensive energy improvements	\$21.27M investment in 41 facilities	TBD
USPS, Dallas, Texas	Comprehensive energy improvements	\$1.824M investment in 8 facilities	Annual savings of \$316,000

Project Name/Location	Project Description	Contractor Investment or Contract Value	Savings
USPS, Oklahoma City, Oklahoma	Comprehensive energy improvements	\$4.7M investment in one facility	Annual savings of \$247,000
USPS, Tampa, Florida	Comprehensive energy improvements	\$2.2M investment in 260 facilities	Annual savings of \$940,000
USPS, Atlanta, Georgia	Comprehensive energy improvements	\$400,000 investment in two facilities	Annual savings of \$80,000
USPS, Birmingham, Alabama	Comprehensive energy improvements	\$1.5M investment in 27 facilities	Annual savings of \$294,000

Also during FY 1998, the Department of Defense awarded six regional ESPCs, including coverage of the Caribbean and Guam. DOD also awarded 18 separate ESPCs and issued four delivery orders. Anticipated annual savings from the awarded contracts and delivery orders is \$8 million and 295 trillion Btu.

In July 1998, President Clinton directed Federal agencies to work more closely with private contractors to retrofit Federal buildings with the best energy-saving technologies at no cost to the taxpayer. Awarding ESPCs on a one-by-one basis has often proven to be complex and time consuming. To make it easier to use ESPCs, DOE's Federal Energy Management Program (FEMP) has developed Regional and Technology-Specific Super ESPCs. Both Regional and Technology-Specific Super ESPCs share the same general contract terminology and provisions with conventional ESPCs and they present several significant advantages to Federal agencies.

Super ESPCs are unlike conventional ESPCs in two fundamental ways. First, a Super ESPC blankets a large geographic territory; a conventional ESPC is used for a specific site. The second, and real benefit to agencies, is that Super ESPCs substantially reduce the lead time to contract with an energy savings company (ESCO) for energy services. Super ESPCs are broad area indefinite delivery, indefinite quantity (IDIQ) contracts that allow agencies to negotiate site-specific delivery orders with an ESCO without having to start the contracting process from scratch. Demand on agency resources to develop and award contracts, as well as lead times, will be greatly reduced, and energy savings will be realized more quickly.

The first Regional Super ESPC covers the Western Region and was awarded to five ESCOs in May 1997. During FY 1998, three more Regional awards were made. On January 12, 1998, the Southeast Regional Super ESPC, covering Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the U.S. Virgin Islands, was awarded to six ESCOs (CES/Way International, DukeSolutions, Energy Masters Corporation, ERI Services, Johnson Controls, and Honeywell). On July 25, 1998, the Midwest Regional Super ESPC, covering Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin was awarded to six ESCOs (DukeSolutions, Energy Pacific, ERI Services, Johnson Controls, NORESO, and EUA Cogenex). Also on July 25, 1998, the Central Regional Super ESPC, covering Colorado, Kansas, Louisiana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming was awarded to six ESCOs (DukeSolutions, Energy Pacific, ERI Services, Johnson Controls, NORESO, and Honeywell).

Each Regional Super ESPC has a contract ceiling of \$750 million. The remaining two Regional Super ESPCs (Mid-Atlantic and Northeast) will be awarded during FY 1999.

During FY 1998, five Regional Super ESPC delivery orders were awarded. Total project investment is more than \$7 million, providing significant energy and cost savings to the Government. These delivery orders include two by the Department of Transportation, and one each by the U.S. Department of Agriculture, the Department of Veteran's Affairs, and the General Services Administration. Many more delivery orders are expected to be awarded during FY 1999.

DOE Regional Super ESPC Delivery Orders

Project Name/Location	Project Description	Project Investment	Savings
Dept. of Agriculture, U.S. Forest Service, Forestry Sciences Laboratory, Corvallis, Oregon	Lighting retrofit, energy management and control system, steam system upgrades, efficient motors, and fume hood controls	\$426,000	Annual savings of \$84,512
Dept. of Transportation, Federal Aviation Administration, Auburn, Washington	Lighting upgrades and pumping modifications	\$348,682	Annual savings of \$50,271
Dept. of Transportation, U.S. Coast Guard, Integrated Support Command, Kodiak Island, Alaska	Lighting retrofit, lighting controls, boiler controls, and energy management system	\$954,353	Annual savings of \$228,824
Dept. of Veteran's Affairs, San Francisco Medical Center, California	Boiler system replacement, energy management and control system, medical air compressor replacement, efficient motors, and lighting retrofit	\$4,763,386	Annual savings of \$528,724
General Services Administration, Food and Drug Administration Building, Bothell, Washington	Energy management and control system, boiler pump upgrades, variable frequency drives, and new air compressors and air dryers	\$527,573	Annual savings of \$102,263

Technology-Specific Super ESPCs emphasize a particular advanced energy-efficiency or renewable energy technology to advance these proven yet still emerging technologies in the Federal marketplace. They blanket the entire nation and carry the same agency resource and time saving benefits as Regional Super ESPCs. ESCOs chosen for these awards have unique capabilities and experience in providing energy savings through installation of the technology, thereby greatly reducing the risks of misapplying emerging technologies. Technology-Specific Super ESPCs can also be comprehensive projects employing multiple energy conservation measures, as long as the named technology is the focus of the project.

The first Technology-Specific Super ESPC was awarded to Industrial Solar Technology Corporation in September 1996 to provide solar hot water heating with parabolic troughs. Contract value is \$30 million. During FY 1998, the photovoltaics Technology-Specific Super ESPC was awarded to two ESCOs (CES/Way International and HEC, Inc.). This contract is worth \$50 million. Over the next several years more Technology-Specific Super ESPCs will be awarded covering a wide range of energy and cost saving technologies. These will include geothermal heat pumps, biomass electric generating systems, and energy-efficient chillers.

A major development for FY 1999 will ease agency access to alternative financing vehicles, including Regional and Technology-Specific Super ESPCs. DOE is establishing a coordinated network of partners under one roof called the FEMP Service Network (FSN). The FSN partnership will include DOE's Office of Energy Efficiency and Renewable Energy, DOE's Golden Field Office, the DOE Regional Offices, National Laboratories, and private sector contractors. The FSN will become a one-stop shop for all the technical and procurement expertise and services agency personnel need to implement successful energy and cost saving projects.

Utility Partnerships

Although the availability of utility-sponsored demand side management programs is waning, Federal agency reports identified the receipt of at least \$1.5 million in incentive rebates in FY 1998. Utility incentive activities reported by the agencies occurred at installations widely distributed across the country. This decentralization of utility incentive participation makes it difficult for agencies to track all utility incentive activities undertaken by all respective sub-agencies, bureaus, and field offices. Total utility incentive benefits received by the Federal Government as a whole for FY 1998 are therefore assumed to be greater than reported.

Under incentive programs, utilities offer rebates to the customer which partially fund and help to promote the installation of new, more efficient equipment such as lighting systems, insulation, cooling equipment, and high efficiency motors. The customer, in this case the Federal Government, is then required to finance the remainder of the equipment cost. Utility incentive programs provide leverage for the user's investment dollars and at the same time help the utility to avoid the cost of building new power plants. EPACT and the Executive Order 12902 place heavy emphasis on utility incentive as a means for Federal agencies to achieve energy conservation.

The following agencies reported participation in demand side management programs in FY 1998:

- Department of Defense,
- Department of Energy,
- Department of the Interior,
- Department of Transportation,
- Department of the Treasury,
- General Services Administration,
- Health and Human Services,
- Housing and Urban Development, and
- National Aeronautics and Space Administration.

F. Life-Cycle Costing (LCC)

Section 544 of NECPA, as amended in 1988, requires DOE to establish practical and effective methods for estimating and comparing the life-cycle costs for Federal buildings using the sum of all capital and operating costs for energy systems of new buildings involved over the expected life of such systems or during a period of 25 years, whichever is shorter, and using average fuel costs and a discount rate determined by the Secretary of Energy. In addition, section 544 requires that procedures be developed in applying and implementing the methods that are established. EPACT further amends NECPA to require, after January 1, 1994, agencies which lease buildings to fully consider the efficiency of all potential building space at the time of renewing or entering into a new lease.

On November 20, 1990, DOE issued a Notice of Final Rulemaking to amend Title 10 of the Code of Federal Regulations, Part 436, which sets forth guidelines applicable to Federal agency in-house energy management programs. The principal regulatory changes involved amending the life-cycle cost methodology and procedures to provide for an annually determined, market-based discount rate and for a more effective system to revise annually the energy cost escalation rates that Federal agencies are required to assume. In developing the final amendments, the Department of Energy actively consulted with the Office of Management and Budget, the Department of Defense, and the General Services Administration.

In the past, DOE's Federal Energy Management Program has published updated fuel price projections for life-cycle cost analyses on October 1 of each year to coincide with the beginning of the fiscal year. The FY 1998 update of the *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis, Annual Supplement to Handbook 135* was published and distributed to Federal energy managers in April 1997.

G. Procurement Policy

The Federal Government is the single largest purchaser of energy-related products and the largest user of energy in the U.S. Each year, the Federal Government purchases an estimated \$10 to \$20 billion in energy-related products. There is enormous potential for energy and dollar savings through procurement policies emphasizing energy efficiency. Such policies will not only reduce emission of greenhouse gases, but will expand the market for energy efficient products, create a strong "market pull" for new technologies, and set a clear example for state and local governments and private industry.

Executive Order 12902, "Energy Efficiency and Water Conservation at Federal Facilities," in conjunction with EPACT, established a clear mandate for agencies to use life-cycle cost analysis in their purchasing of energy-consuming equipment and to purchase "best practice" products whenever practicable and whenever they meet the agency's specific performance requirements and are cost-effective. Best practice products are those which are in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets Federal standards.

Real or perceived barriers to energy-efficient purchasing also arise at the policy level. To ameliorate this situation, a Federal Acquisition Circular (FAC)—the medium for Federal Acquisition Regulation (FAR) amendments—was issued on August 22, 1997. The new regulation includes language on the acquisition of environmentally preferable and energy-efficient products and services, defining "energy-efficient" in accordance with Executive Order 12902. The relevant section from 48 CFR, Part 23.704 states:

- (a) Agencies shall implement cost-effective contracting preference programs favoring the acquisition of environmentally preferable and energy-efficient products and services.
- (b) The following environmental objectives shall be addressed through the acquisition process:
 - (1) Obtaining products and services considered to be environmentally preferable (based on EPA-issued guidance).
 - (2) Obtaining products considered to be energy-efficient; i.e., products that are in the upper 25 percent of energy-efficiency for all similar products or products that are at least 10 percent more efficient than the minimum level that meets Federal standards (see E.O. 12902, Section 507).

DOE has also developed policy guidance for its own purchasing officers and program staff, including a section on energy-efficient purchasing in the DOE Acquisition Guide.

In FY 1998, DOE published a feasibility study that was produced in response to Section 152 of EPACT directing the Secretary of Energy to conduct a study to evaluate the potential use of the purchasing power of the Government to promote the development and commercialization of energy-efficient products. The study has two major parts: the first covers the process used in buying new products, the models in use, and how to do a new technology procurement, while the second part covers product selection, including a discussion of product characteristics with merit.

To assist Federal agencies in meeting the requirements of EPACT and E.O. 12902, the DOE Office of Federal Energy Management Program (FEMP), in cooperation with the Council on Environmental Quality and OMB's Office of Federal Procurement Policy, sponsored the Federal Procurement Challenge in September 1995. The heads of 22 Government agencies, representing almost 95 percent of the total Federal buying power, signed the Procurement Challenge committing themselves to purchasing energy- and water-saving products that will reduce their operating costs.

DOE FEMP provides Procurement Challenge participants with decision tools and technical support to help them achieve the Challenge goals. In 1998, FEMP produced and distributed seven additional product energy efficiency recommendations to be added to the one-stop shopping guide, *Buying Energy Efficient Products*, to help Federal purchasers identify products which meet the energy efficiency requirements of E.O. 12902.

The guide, which is also available on FEMP's Internet Web site at www.eren.doe.gov/femp/procurement, now includes 29 product energy efficiency

recommendations. The guide also covers streamlined procurement, including a discussion of the Basic Ordering Agreement for CFC-free chillers and will ultimately contain recommendations for 60 products. Categories covered range from fluorescent lighting to office equipment to commercial chillers. These recommendations will help agencies meet the goals of the Procurement Challenge by clearly defining the top 25 percent of efficiency for each product category, as well as illustrating the dollar savings that purchasers will realize from choosing products that meet the recommended levels instead of less efficient models. In addition, these recommendations are given in conjunction with EPA's ENERGY STAR® Program, which labels those products that meet or exceed the energy efficiency criteria for government purchasing.

To be most effective, the product efficiency recommendations must reach Federal buyers in a form they can use and be closely linked with other purchasing guidance, such as technical specifications and agency-specific policies and practices. Pursuant to this concern, FEMP has made considerable progress in partnership with the two major Government supply agencies, the General Services Administration and the Defense Logistics Agency. FEMP is working with GSA's Tools and Appliance Center in Fort Worth and with the Defense Logistics Agency (DLA) to identify energy efficient appliances in their supply system and code them with the energy efficient symbol E_E . Four appliances have been labeled so far. Cooperative efforts with GSA and DLA will extend use of the E_E symbol to other products in the Federal supply system, including on-line databases for electronic commerce. As a result of FEMP's coding efforts, customers shopping on-line can query for performance information.

Both DOD and GSA use the Federal Logistics Information System (FLIS) to procure products and equipment. FLIS catalogs millions of items by National Stock Numbers which can be accessed by vendor name or code. Currently the FAR requires only information on price, performance, and delivery schedule. DLA is trying to establish environmental segments and attributes within FLIS. DOD's Joint Logistics Commanders (JLC) support this initiative and have established the JLC Environmental Steering Committee. The Steering Committee will spearhead the development of an acquisition process to collect and rank information on environmental preferences, including energy efficiency, hazardous or toxic materials in the item or packaging, percent of recycled content, and biodegradability.

FEMP is working to expand the line of products available through Single Order Purchasing. The biggest success has been the chiller Basic Ordering Agreement (BOA). This innovative initiative was developed by the DOE Office of Defense Programs, FEMP, and the General Services Administration to streamline the procurement of large, energy-efficient, CFC-free replacement chillers. Effective on November 15, 1996, the BOA allows Federal agencies to purchase chillers through the GSA Schedule by adopting a series of general specifications while permitting other important features to be individually specified. Five manufacturers have met the DOE general specifications and any chiller bought under this agreement complies with Executive Order 12902. The DOE Rocky Flats facility was the first site to use the BOA. The streamlined procurement takes 45 to 60 days, allowing customers to avoid the cumbersome bidding process previously required for chiller purchases. Cumulative energy cost savings are estimated at \$1.4 billion over the 20-year life of replacement chillers to be installed in Federal facilities. Agencies will also realize an estimated \$600 million in administrative cost savings and associated operation/

maintenance services. This BOA will help "pull" the entire chiller market toward greater efficiency.

Coordination efforts with other buyer groups, utilities, and "market-pull" programs give FEMP's Procurement Challenge even greater leverage in meeting its energy saving, cost saving, and pollution prevention objectives. To help educate and inform government buyers at the State, local, and Federal levels on energy-efficient purchasing practices, DOE and EPA began the Energy Efficient Procurement Collaborative and the ENERGY STAR® Procurement Challenge. Its mission is to help educate and inform government buyers at the State, local, and Federal levels on energy-efficient purchasing practices, including on-line access to databases on efficient products and coordination of efficiency criteria and model specifications among public agencies. An important part of the strategy is to gain support at the top from such groups as the National Governors' Association and National Association of Counties.

Other FEMP outreach activities include the "You Have the Power" campaign to increase awareness of energy efficient procurement among Federal personnel. The Alliance to Save Energy, a non-profit, bipartisan group promoting energy efficiency currently chaired by Senator Jeff Bingaman, is developing a program with industry to promote the use of the energy efficient symbol, ^E_E.

The Energy Efficiency Procurement Working Group convened three interagency roundtable discussions on November 4, 5, and 6, 1997, to obtain feedback on Federal procurement issues. The roundtables were intended to improve the Working Group's and FEMP's understanding of the Federal procurement process, to obtain feedback on existing program activities and information, to conduct market research to obtain a better perspective on the procurement process, and to solicit ideas on how to increase the program's effectiveness. The Working Group reached several conclusions from the roundtable discussions, including that agency personnel need to be trained and educated about mandates and Executive Orders with an emphasis on "how to", there needs to be an emphasis on educating the general public on energy efficiency, and that linking water use to energy savings would be effective in reducing energy use.

In addition, the Energy Efficient Procurement Working Group held subsequent meetings in December of 1997 and 1998 to discuss the conclusions reached by the roundtables and to obtain feedback on program activities.

H. Public Education Programs

NECPA, 42 U.S.C. § 8258(b), requires the Secretary of Energy to include in this and subsequent annual reports information on public education programs carried out by Federal agencies and previously reported under the authority of section 381 of the Energy Policy and Conservation Act (EPCA), 42 U.S.C. § 6361(b).

EPCA requires the Secretary of Energy to establish and carry out public education programs to encourage energy conservation and energy efficiency and to promote vanpooling and carpooling arrangements. The Department of Transportation (DOT) has promoted ride sharing activities, while DOE has been responsible for other energy conservation education programs.

Through its Federal Highway Administration, DOT obligates Federal aid funds to assist State and local agencies in implementing programs designed to encourage the use of car pools, van pools, and buses by commuters. DOT efforts have included van pool acquisition programs, fringe and corridor parking facilities, ride-matching projects, preferential treatments for high occupancy vehicles, and transit service improvement. Since 1974, more than \$875 million in Federal aid highway funds have been spent on such projects in an effort to establish self-sufficient programs across the Nation.

The Department of Transportation's Technology Sharing Program (TSP) makes high quality reports in a user-friendly format available to the non-scientist or technical person to understand and act on transportation problems of state and local governments. This low-cost program disseminates technical reports on a variety of topics to this user community, thus saving them the time and cost of researching the information on an individual basis, or not having the information at all. The TSP products consist of reports, manuals, and summary documents which can be ordered at the following Internet site: <http://www.tsp.dot.gov/cgi-bin/borwsere.pl>

Recent emphasis areas have included commuter issues and travel demand, traffic congestion, land-use development, and risk assessment. In addition, a variety of products of the National Science and Technology Council's Subcommittee on Transportation R&D are also available through the site.

The Department of Energy's public education programs encompass a wide variety of services, objectives, and audiences, covering all major areas of conservation and renewable energy. DOE has organized its technology transfer programs to meet the specific information requirements of various audiences.

Three services are managed through subcontracts at the National Renewable Energy Laboratory (NREL): DOE's Energy Efficiency and Renewable Energy Clearinghouse (EREC), DOE's Energy Efficiency and Renewable Energy Network (EREN), and the FEMP Help Desk.

EREC provides basic, technical, and financial information on various energy efficiency/renewable energy technologies and programs. The audience served by EREC includes the general public, business and industry, educational community, media, utility companies, and state and local governments. Information is provided in the form of fact sheets, DOE and National Laboratory

books and brochures, bibliographies, and on-line computer-generated technology synopses. Some requests are handled completely over the phone and the caller receives no publications. EREC's telephone number is 800-DOE-EREC and its Web site is at www.eren.doe.gov/consumerinfo. In FY 1998, EREC staff responded to 83,915 inquiries and disseminated 295,317 publications.

EREN is the official Web site of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). The audience served by EREN includes business and industry, the general public, the educational community, the media, and state and local governments. EREN's Web address is www.eren.doe.gov. In 1998, EREN averaged 70,000 unique users per month, and 2.8 million hits per month. The site is a comprehensive resource for energy information, providing links to more than 600 energy-related Web sites, allowing keyword searches, and offering a full range of information on topics such as building energy efficiency, wind power, and alternative fuels. In addition, EERE provides its organizational chart, major initiatives, and budget. The site also features current press releases, consumer information, and lists of discussion groups on various energy-related topics. There are even forms to submit energy-related questions and to subscribe to the EREN Network News e-mail newsletter.

The Office of Federal Energy Management Programs (FEMP) Help Desk provides Federal energy managers with specialized information on effective energy management practices, technical assistance on implementing Federal sector energy projects, financing information, energy modeling software, publications, and energy management training programs. The primary goal of this service is to assist Federal agencies in meeting various legislative requirements. The Help Desk responds to requests for information via a toll-free telephone service, electronic mail, and through the Internet. The Help Desk was merged into EREC in FY 1997. The telephone number is 800-DOE-3732. The Web site is www.eren.doe.gov/femp.

The National Energy Information Center (NEIC) responds to public and private sector questions on energy production, consumption, prices, resource availability, and projections of supply and demand. It also makes available the publications produced by the DOE Energy Information Administration. NEIC provides information to Federal employees and the public at www.eia.doe.gov. Electronic inquiries may be sent to infoctr@eia.doe.gov. In 1998, NEIC staff responded to 23,272 inquiries and distributed approximately 36,756 publications.

The Office of Scientific and Technical Information (OSTI), as part of the Office of Science, provides coordination and direction for the management of scientific and technical information resulting from the DOE's multi-billion dollar research and development activities. As a cross-cutting Headquarters office, OSTI accomplishes its mission through the Scientific and Technical Information Program (STIP). STIP operates in partnership with program offices, operations offices, and contractors to develop and implement information management "best business practices" to ensure that DOE maximizes the return on its \$6 billion annual R&D investment.

In support of national competitiveness, OSTI collects, processes, and disseminates DOE-originated research information and selected worldwide research literature on subjects of interest to domestic communities. OSTI also provides scientific and technical information services to, or on behalf of, DOE elements in support of Departmental mandates, missions, and objectives. OSTI serves the public directly or indirectly through agreements with the National Technical

Information Service, Government Printing Office, depository libraries, and commercial vendors. In 1998 OSTI unveiled EnergyFiles, a publicly available, web-based gateway to a wide array of energy-related information. Included among the EnergyFiles family is the DOE Information Bridge, an electronic full-text collection of 26,000 documents available to the DOE research community. DOE Information Bridge was made publicly available during 1998.

OSTI manages a comprehensive collection of approximately one million scientific and technical information documents, representing 50 years of energy-related activities. The organization also maintains the Energy Science and Technology Database (EDB), which has more than 3.5 million summaries of DOE and worldwide information. EDB is made available to the public on-line and on CD-ROM through commercial vendors. The majority of its users are industry, Federal and State officials, contractors, libraries, research institutions, and the public. In FY 1998, OSTI added more than 200,000 research summaries to the database and provided 22,000 full-text documents for public availability to the National Technical Information Service and the Government Printing Office Depository Library Program.

FY 1998 initiatives included a strategic effort to process and disseminate information in an increasingly decentralized environment. As a continuing step towards a "National Library of Energy Science and Technology," the effort will significantly improve DOE and public access to bibliographic and full-text information without major additional investment. In addition to the core program activities, OSTI's other services include developing Internet-based applications for DOE offices, providing information management advice and consultation to the Departmental community, managing and disseminating DOE and Nuclear Regulatory Commission scientific and technical software, and representing the United States in multilateral and bilateral international information exchange agreements.

The DOE public information mechanisms include several direct service programs designed to provide technical assistance to specific target groups. Some of these include:

- The State Energy Program, a formula grant program, which provides a flexible, supportive framework to enable the States to address their own energy priorities, as well as focus on national initiatives and strengthens their capabilities to deliver energy services. This customer-driven program seeks to increase the extent to which Federal, State, and local governments work with other public and private sector entities to achieve widespread adoption of available energy efficiency and renewable energy technologies, and to demonstrate the use of emerging technologies which benefit the entire economy. This also includes working with the building industry and consumers for improvements in residential energy efficiency.
- The Special Projects component of the State Energy Program offers States the opportunity to apply for competitively selected grants covering a wide range of activities that may expand upon a State's formula grant activities or offer an opportunity to take new initiatives. These projects are designed to utilize the State's unique and effective skills in forming and sustaining partnerships with local governments, industry, utilities, and private organizations to remove barriers and implement programs using DOE's Office of Energy Efficiency and Renewable Energy's targeted technologies, thereby providing DOE a direct way to accomplish the Department's technology deployment goals. Many of these projects involve

the dissemination of information about, and/or the demonstration or the viability of a variety of energy efficiency and renewable energy applications.

- The Industrial Assessment Center Program (IAC) provides no-charge energy, waste, and productivity assessments to help small and mid-sized manufacturers identify measures to maximize energy-efficiency, reduce waste, and improve productivity. The analyses are performed by local teams of engineering faculty and students from 30 participating universities across the country.

A full list of DOE's energy education, extension, and information services is provided in Appendix E to this report.

II. ENERGY MANAGEMENT IN BUILDINGS AND FACILITIES

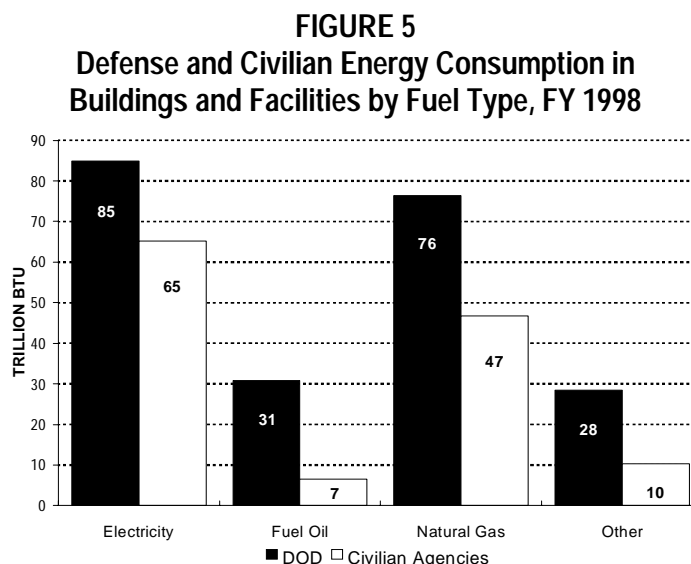
A. Energy Consumption and Costs for Buildings and Facilities

The Federal Government provides energy to approximately 500,000 buildings and facilities comprising approximately 3.1 billion square feet of floor area. This energy is used to provide lighting, heating, ventilation, air conditioning, and other standard building services, as well as a significant amount of process operations that are not reported separately.¹¹ Federal buildings include both Federally-owned and leased buildings. However, in many instances the lessor pays the energy bill, and consumption and cost data may not be available to the Government. Accordingly, Federal agencies report data for leased space to the maximum extent practicable.¹²

Table 4-A shows the total primary energy consumed in Federal buildings and facilities, including energy resources used to generate, process, and transport electricity and steam.¹³ Primary energy consumed in buildings and facilities in FY 1998 decreased 12.8 percent from FY 1985 and increased 1.5 percent from FY 1997.

Table 4-B shows that agencies have decreased net energy consumption in buildings by 25.8 percent, from 471.0 trillion Btu in FY 1985 to 349.4 trillion Btu in FY 1998. A comparison to FY 1997 shows a decrease of 0.1 percent in total buildings energy consumption.

Of the 28 agencies represented on the tables for FY 1998, 11, including DOD, consume more than 98 percent of the reported buildings energy use. Energy used in buildings accounts for approximately 33.5 percent of the total 1.04 quads used by the Federal Government. The mix of Federal buildings energy use for Defense and civilian agencies is depicted in Figure 5. Electricity constitutes 42.9 percent (150.0 trillion Btu) of Federal buildings energy use; 35.3 percent is accounted for by natural gas



¹¹Process energy is that energy used in buildings for operations other than standard building services. In cases where separate reporting was not possible, due to the lack of meters or estimation techniques, process energy was reported as though it was part of the energy used for standard building services.

¹²The General Services Administration (GSA) is the primary leasing agent for the Federal Government, although most of the other agencies do have some leasing authority. In some cases, GSA will delegate operations and maintenance responsibility to individual agencies for leased space, requiring the agency to be responsible for paying the utility bills and reporting energy consumption.

¹³Source conversion factors of 11,600 Btu per kilowatt hour for electricity and 1,390 Btu per pound of steam are used to calculate primary energy consumption. See Appendix B for conversion factors for net energy consumption.

TABLE 4-A
FEDERAL PRIMARY ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
USPS	39,441.0	46,961.6	48,347.0	50,147.1	54,073.7	55,445.6	56,551.3	58,757.3	53,728.0	56,049.9	42.1	4.3
DOE	57,430.1	54,839.0	52,941.5	56,282.4	57,050.7	55,100.0	53,654.4	53,930.0	50,225.1	48,980.3	-14.7	-2.5
VA	42,333.7	43,818.9	44,954.2	44,759.7	45,620.4	46,265.4	46,823.0	48,062.3	48,419.3	48,899.3	15.5	1.0
GSA	41,207.0	35,985.0	34,685.4	34,300.3	34,198.2	33,661.4	32,912.4	34,286.0	34,492.7	34,469.9	-16.3	-0.1
ST ¹	689.2	817.3	845.4	829.4	133.4	235.6	255.3	780.5	968.1	18,863.1	2,637.0	1,848.5
DOJ	8,962.7	9,376.1	12,038.8	9,285.9	11,999.4	11,390.0	11,836.6	14,391.8	14,681.7	15,263.0	70.3	4.0
HHS	10,458.1	16,191.3	14,353.7	15,857.0	16,086.8	16,320.7	11,904.8	12,623.5	14,320.3	13,966.9	33.6	-2.5
NASA	6,810.9	8,021.3	8,206.4	7,946.3	8,007.7	8,115.1	8,670.7	9,491.2	9,990.5	10,066.4	47.8	0.8
DOT	8,298.7	7,114.8	6,609.9	8,355.1	8,687.6	8,427.4	9,020.4	9,097.4	9,378.3	8,547.1	3.0	-8.9
DOI	8,432.5	7,511.8	7,746.9	6,824.4	8,320.8	8,186.2	7,646.7	6,177.5	7,203.8	7,422.2	-12.0	3.0
USDA	4,347.2	5,397.9	5,604.9	5,339.6	5,477.6	5,253.7	5,118.6	5,280.2	4,701.3	4,969.0	14.3	5.7
TRSY	1,451.0	5,004.1	4,372.2	4,805.4	4,250.4	4,351.0	3,752.5	3,607.0	4,802.7	4,553.5	213.8	-5.2
DOL	3,687.8	3,864.3	3,784.8	3,821.2	3,955.1	4,033.6	3,922.1	4,043.4	4,079.0	4,109.4	11.4	0.7
TVA	1,321.0	1,410.5	1,423.4	1,422.0	1,465.1	2,228.3	2,465.3	2,387.9	2,250.3	2,220.2	68.1	-1.3
EPA	1,618.3	1,616.4	1,782.6	1,811.6	1,898.2	1,984.3	2,131.8	2,096.3	2,075.0	2,083.4	28.7	0.4
DOC	1,189.1	3,227.4	3,220.7	1,483.1	1,664.7	2,047.3	1,361.7	1,313.7	1,303.3	1,207.8	1.6	-7.3
HUD	349.3	426.5	417.0	384.1	348.6	323.7	316.1	332.9	320.6	310.4	-11.1	-3.2
FCC	29.5	41.0	43.7	33.9	35.1	39.4	39.4	31.7	31.7	31.7	7.2	0.0
PCC	90.5	97.2	110.2	102.3	110.5	106.8	108.6	110.3	115.3	0.0	-100.0	-100.0
OTHER*	947.5	1,747.8	1,281.1	1,273.7	1,035.2	1,023.3	3,054.3	5,026.6	5,292.9	5,045.0	432.5	-4.7
CIVILIAN AGENCIES												
TOTAL	239,095.2	253,470.1	252,769.9	255,064.4	264,419.4	264,538.7	261,546.1	271,827.5	268,380.0	287,058.3	20.1	7.0
DOD	581,170.2	580,184.6	523,370.8	524,164.8	523,295.3	502,215.0	476,188.2	452,388.4	436,940.7	428,492.1	-26.3	-1.9
ALL AGENCIES												
TOTAL	820,265.5	833,654.7	776,140.7	779,229.2	787,714.6	766,753.7	737,734.3	724,216.0	705,320.7	715,550.4	-12.8	1.5
MBOE	140.8	143.1	133.2	133.8	135.2	131.6	126.6	124.3	121.1	122.8		
Petajoules	865.4	879.5	818.8	822.1	831.0	808.9	778.3	764.0	744.1	754.9		

DATA AS OF 01/10/00

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FERC.

Note: This table uses a conversion factor for electricity of 11,600 Btu per kilowatt hour and 1,390 Btu per pound of steam. Agencies are listed in descending order of consumption for the current year. Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 4-B
FEDERAL NET ENERGY CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
VA	24,552.0	24,380.1	24,733.0	24,620.0	25,077.2	25,213.4	25,075.4	26,172.3	26,062.0	26,216.9	6.8	0.6
DOE	32,923.2	29,297.3	28,077.6	29,564.3	30,546.8	29,193.0	28,011.6	25,987.3	23,746.2	23,126.7	-29.8	-2.6
USPS	16,238.3	18,480.0	18,620.8	19,449.2	21,159.8	21,602.2	21,649.7	22,210.0	22,006.4	22,683.9	39.7	3.1
GSA	16,563.0	13,937.3	13,116.3	13,061.4	13,075.2	12,832.9	12,366.7	13,439.4	13,353.7	13,123.7	-20.8	-1.7
DOJ	6,112.0	4,863.8	5,894.3	3,869.2	6,245.8	6,143.9	6,303.9	7,490.6	8,003.7	7,783.0	27.3	-2.8
ST ¹	232.1	267.7	274.2	273.8	45.3	82.9	92.9	289.2	337.5	7,422.7	3,098.1	2,099.3
HHS	5,837.3	7,957.0	7,107.1	7,954.7	7,969.1	8,231.9	6,024.2	6,610.3	7,417.8	6,953.1	19.1	-6.3
NASA	3,095.7	3,450.1	3,375.6	3,335.8	3,250.4	3,262.6	3,466.3	3,730.4	3,875.4	3,941.4	27.3	1.7
DOI	4,762.4	4,039.4	3,886.2	3,173.4	3,974.3	3,922.1	3,596.3	2,979.1	3,668.5	3,747.4	-21.3	2.2
DOT	4,500.3	3,750.4	3,297.6	3,918.0	3,886.6	3,903.0	3,856.9	3,952.2	3,800.1	3,667.9	-18.5	-3.5
DOL	2,153.0	2,137.1	2,044.1	2,063.7	2,145.8	2,158.3	2,028.8	2,153.9	2,153.9	2,190.2	1.7	1.7
USDA	2,096.3	2,363.0	2,342.4	2,151.6	2,234.8	2,164.5	2,083.1	2,261.3	1,996.0	2,111.1	0.7	5.8
TRSY	615.0	1,918.4	1,494.7	1,749.1	1,568.0	1,624.7	1,418.3	1,484.9	1,904.4	1,741.2	183.1	-8.6
EPA	772.3	747.0	822.4	839.7	894.1	943.4	1,021.1	1,023.3	1,011.5	1,022.9	32.4	1.1
TVA	402.4	427.8	426.6	425.6	439.8	664.0	748.5	728.4	665.6	658.4	63.6	-1.1
DOC	540.3	1,376.0	1,406.9	531.0	571.9	752.9	494.9	490.1	457.2	429.9	-20.4	-6.0
HUD	116.9	140.3	132.2	123.1	116.2	113.5	105.9	115.4	109.3	103.1	-11.8	-5.7
FCC	11.2	14.8	14.9	12.4	12.9	14.1	14.1	12.8	12.8	12.8	14.4	0.0
PCC	26.6	28.6	32.4	30.1	32.5	31.4	31.9	32.4	33.9	0.0	-100.0	-100.0
OTHER*	369.0	698.5	503.8	518.3	426.0	403.9	1,189.7	1,884.6	1,989.1	1,898.7	414.5	-4.5
CIVILIAN AGENCIES TOTAL	121,919.5	120,274.5	117,603.1	117,664.1	123,672.5	123,258.6	119,580.1	123,047.9	122,605.0	128,834.8	5.7	5.1
DOD	349,076.7	321,101.6	286,885.7	295,719.8	279,726.5	262,661.5	247,166.9	235,688.1	227,070.0	220,567.6	-36.8	-2.9
ALL AGENCIES TOTAL	470,996.2	441,376.1	404,488.9	413,383.9	403,399.0	385,920.2	366,747.0	358,736.0	349,675.0	349,402.4	-25.8	-0.1
MBOE	80.9	75.8	69.4	71.0	69.3	66.3	63.0	61.6	60.0	60.0		
Petajoules	496.9	465.6	426.7	436.1	425.6	407.1	386.9	378.5	368.9	368.6		

DATA AS OF 01/10/00

*Other includes for certain years the CFTC, CIA, EEOC, FEMA, FTC, NARA, NSF, NRC, OPM, RRB, SSA, USIA, and FERC.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Agencies are listed in descending order of consumption for the current year.

Sum of components may not equal total due to independent rounding.

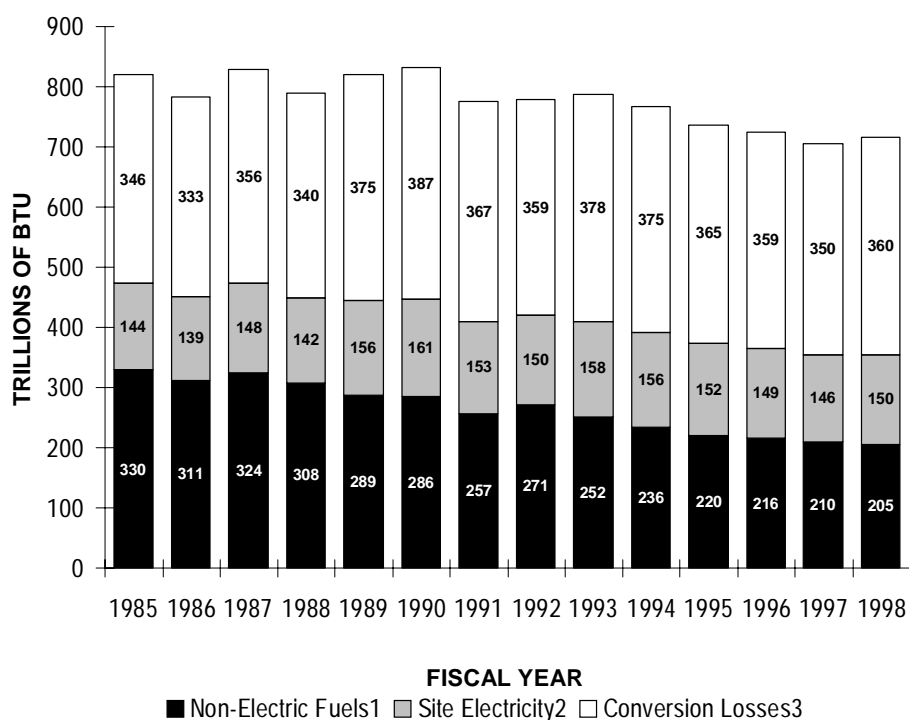
¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

Source: Federal Agency Annual Energy Management Data Reports

(123.2 trillion Btu), and 10.7 percent by fuel oil (37.3 trillion Btu). Coal, purchased steam, liquefied petroleum gas (LPG)/propane, and energy reported as "other" (comprised mainly of chilled water and renewable energy), account for the remaining 11.1 percent.

Figure 6 illustrates the proportion of energy consumption in buildings and facilities that is attributable to electricity for FY 1985 through FY 1998. The figure also breaks out the amount of Btu lost through the generation and transmission processes and amount of Btu delivered to the site. In FY 1998, electricity consumption, including energy used at the source of generation, accounted for approximately 71.3 percent (510,063.4 billion Btu) of the total primary Btu consumed in buildings and facilities (715,550.4 billion Btu; see Table 4-A). Of this amount, approximately 29.4 percent or 150.0 trillion Btu reached the site of use. The remaining 70.6 percent, 360.0 trillion Btu, was lost during the generation and transmission processes.

FIGURE 6
Consumption of Electricity and Other Fuels in Buildings/Facilities,
FY 1985 through FY 1998



¹Includes Fuel Oil, Natural Gas, LPG/Propane, Coal, Purchased Steam, and Other. Uses a conversion factor for steam of 1,390 Btu per pound (source conversion).

²Uses a conversion factor of 3,412 Btu per kilowatt hour. Amount of energy which reaches the site of use when generation and transmission losses are subtracted.

³Amount of energy lost through generation and transmission processes. When added to amount of energy reaching the point of use, the total equals amount of Btu consumed at the source. The source conversion factor is 11,600 Btu per kilowatt hour.

Source: Federal Agency Annual Energy Management Data Reports

Decreases in consumption relative to FY 1997 were seen in fuel oil (5.7 percent), purchased steam (0.1 percent), natural gas (2.2 percent), and fuels reported under the category of "other" (34.0 percent). Increases from the previous year were seen in electricity (3.0 percent), LPG/propane (24.4 percent), and coal (2.0 percent).

The mix of fuels consumed by Government buildings has changed notably from FY 1985 through FY 1998. The actual consumption of electricity has remained fairly steady since FY 1985, with an increase of 4.0 percent in FY 1998 while square footage has declined 8.8 percent. However, the proportion of energy consumed in Federal buildings and facilities that is electricity has increased from 30.6 percent in FY 1985 to 42.9 percent in FY 1998. Over the same period, fuel oil use decreased from 22.9 percent of the total in FY 1985 to only 10.7 percent in FY 1998. The portion of the Federal buildings fuel mix comprised by natural gas has increased from 30.7 percent in FY 1985 to 35.3 percent in FY 1998. The use of coal as a fuel source, which accounted for 12.3 percent of the total energy consumed in FY 1985, has declined to 5.5 percent of the total in FY 1998. Contributing to this has been the practice of agencies, such as DOE, to purchase steam rather than generating their own in coal-fired plants.

As shown in Table 5, the consumption of petroleum-based fuels in buildings during FY 1998 decreased 63.7 percent compared to FY 1985 and 4.0 percent from FY 1997. Efforts by agencies to utilize natural gas as a cost-effective substitute for petroleum-based fuels in buildings, as well as conservation of fuel oil and LPG/propane in buildings contributed to these reductions. Petroleum fuel consumption in buildings during FY 1998 represented only 11.5 percent of all energy consumed in Federal buildings. Of this amount, 92.6 percent is attributed to fuel oil and the remaining 7.4 percent to LPG/propane.

The energy used in buildings in FY 1998 accounted for approximately 41.5 percent of the total Federal energy bill. Tables 6-A and 6-B show that the Federal Government spent approximately \$3,530.3 million for buildings energy during the fiscal year, a decrease in constant dollars of approximately \$61.8 million from FY 1997 expenditures. The combined cost of buildings energy in FY 1998 was \$10.10 per million Btu, down 1.6 percent from the combined cost of \$10.27 reported in FY 1997.

Figure 7 illustrates energy expenditures for buildings and facilities from FY 1985 through FY 1998. In constant 1998 dollars, Federal energy costs for buildings and facilities decreased 38.4 percent from \$5,732.0 million in FY 1985 to \$3,530.3 million in FY 1998. The combined cost for buildings energy in constant dollars in FY 1998 was \$10.10 per million Btu, down 17.0 percent from \$12.17 per million Btu in FY 1985.

FIGURE 7
Energy Costs (Constant 1998 Dollars) in Buildings and Facilities, FY 1985 through FY 1998

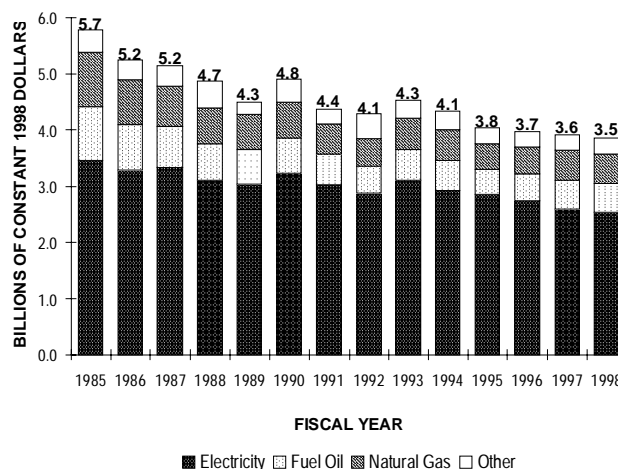


TABLE 5
PETROLEUM-BASED FUEL* CONSUMPTION IN BUILDINGS AND FACILITIES
(In Billions of Btu)

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
DOD	96,817.3	69,030.1	59,451.5	65,654.1	55,585.9	50,285.7	42,939.0	42,861.7	35,214.4	32,354.5	-66.6	-8.1
ST ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.8	21.2	1,498.0	0.0	6,958.9
DOE	1,650.8	1,900.5	2,063.7	2,042.7	1,943.5	1,924.4	1,973.5	1,554.1	1,394.0	1,174.5	-28.8	-15.7
VA	2,176.7	2,219.3	1,404.9	1,506.0	1,533.9	1,827.4	1,292.9	2,098.2	1,186.3	954.6	-56.1	-19.5
DOT	2,376.9	1,524.1	1,308.4	1,426.0	854.0	1,001.6	911.7	709.2	670.5	816.8	-65.6	21.8
USPS	1,673.2	1,502.2	1,219.4	1,195.8	988.8	983.7	813.9	595.2	819.0	1,139.4	-31.9	39.1
DOI	1,591.6	1,273.9	1,141.1	919.1	1,181.9	1,560.6	1,574.3	1,177.7	799.6	964.7	-39.4	20.6
HHS	2,246.4	2,138.7	1,545.9	2,144.2	1,765.2	1,525.7	1,152.5	1,718.8	760.7	498.6	-77.8	-34.5
DOL	437.8	331.2	258.3	263.6	276.1	277.5	210.8	220.6	254.2	226.1	-48.4	-11.1
DOJ	381.7	371.6	503.7	383.8	250.8	234.8	182.8	234.3	134.9	103.1	-73.0	-23.6
NASA	230.2	277.8	161.6	217.6	129.0	139.6	88.6	110.9	88.3	93.5	-59.4	5.8
USDA	414.2	260.0	291.3	242.9	255.6	236.3	244.1	242.5	272.2	270.6	-34.7	-0.6
CIA	0.0	0.0	0.0	0.0	0.0	0.0	49.6	87.9	84.6	60.2	N/A	-28.8
GSA	991.3	668.1	443.1	418.2	359.4	379.8	199.0	242.3	143.0	54.8	-94.5	-61.7
TRSY	22.5	281.3	127.7	84.2	190.5	160.8	116.6	116.2	57.0	44.8	99.4	-21.5
EPA	16.8	5.9	6.4	17.6	13.9	26.8	43.4	51.8	26.1	9.6	-42.6	-63.1
DOC	130.3	77.6	13.1	9.8	23.8	52.4	10.8	33.4	9.3	8.7	-93.3	-7.1
TVA	4.2	3.2	0.1	1.3	2.7	3.5	3.9	4.1	0.0	3.0	-29.8	N/A
FCC	1.7	1.9	1.0	1.3	1.3	1.3	1.3	1.7	1.7	1.7	0.8	0.0
OTHER**	76.1	83.7	59.1	67.2	67.6	49.1	49.1	57.3	60.9	58.0	-23.8	-4.8
TOTAL	111,239.8	81,951.0	70,000.2	76,595.5	65,423.9	60,671.0	51,857.6	52,139.7	41,998.1	40,335.3	-63.7	-4.0

DATA AS OF 01/10/00

*Petroleum-based fuels include fuel oil and LPG/propane.

**Other includes for certain years EEOC, FEMA, NSF, SSA, and USIA.

Note: FY 1997 and FY 1998 contains estimated data for the following agencies: FEMA, FTC, and OPM.

Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 6-A
DEFENSE AND CIVILIAN FEDERAL COSTS FOR BUILDINGS ENERGY IN FY 1998
(In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE	1,416.214	160.999	296.726	14.569	32.943	163.328	0.732	2,085.510
CIVILIAN	1,146.103	29.605	193.516	11.453	5.558	55.199	3.363	1,444.797
TOTAL	2,562.317	190.604	490.242	26.022	38.501	218.527	4.095	3,530.307

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	= 58.27 / MWH
FUEL OIL	= 0.71 / GALLON
NATURAL GAS	= 4.10 / THOUSAND CUBIC FEET
LPG/PROPANE	= 0.83 / GALLON
COAL	= 49.38 / SHORT TON
PURCHASED STEAM	= 13.94 / MILLION BTU
OTHER	= 4.11 / MILLION BTU

DATA AS OF 01/10/00

Note: Contains estimated data for the following agencies: FEMA, FCC, FTC, and OPM.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports.

TABLE 6-B
CONSUMPTION AND COSTS OF FEDERAL BUILDINGS ENERGY
BY FUEL TYPE IN FY 1998, FY 1997, AND FY 1985
(Constant 1998 Dollars)

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
FY 1998			
ELECTRICITY	150,029.0	17.0788	2,562.317
FUEL OIL	37,334.7	5.1053	190.604
NATURAL GAS	123,203.7	3.9791	490.242
LPG/PROPANE	3,000.6	8.6724	26.022
COAL	19,162.8	2.0092	38.501
PURCHASED STEAM	15,676.0	13.9402	218.527
OTHER	995.7	4.1126	4.095
TOTAL	349,402.4		3,530.307
AVERAGE COST PER MMBTU = \$10.104			
FY 1997			
ELECTRICITY	145,649.3	17.7247	2,581.602
FUEL OIL	39,586.6	5.0358	199.351
NATURAL GAS	126,032.2	4.1567	523.879
LPG/PROPANE	2,411.5	9.2790	22.377
COAL	18,790.9	2.1725	40.823
PURCHASED STEAM	15,696.0	13.6868	214.827
OTHER	1,508.5	6.1513	9.279
TOTAL	349,675.1		3,592.137
AVERAGE COST PER MMBTU = \$10.273			
FY 1985			
ELECTRICITY	144,247.9	23.9996	3,461.894
FUEL OIL	107,628.1	8.5428	919.446
NATURAL GAS	144,759.3	6.6172	957.905
LPG/PROPANE	3,611.7	9.9095	35.791
COAL	58,069.5	3.3674	195.547
PURCHASED STEAM	7,969.8	16.1687	128.861
OTHER	4,709.9	6.9132	32.561
TOTAL	470,996.2		5,732.004
AVERAGE COST PER MMBTU = \$12.169			

DATA AS OF 01/10/00

Note: FY 1997 contains estimated data for the following agencies: FEMA, FTC, and OPM;
FY 1998 contains estimated data for: FEMA, FCC, FTC, and OPM.

This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour. Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

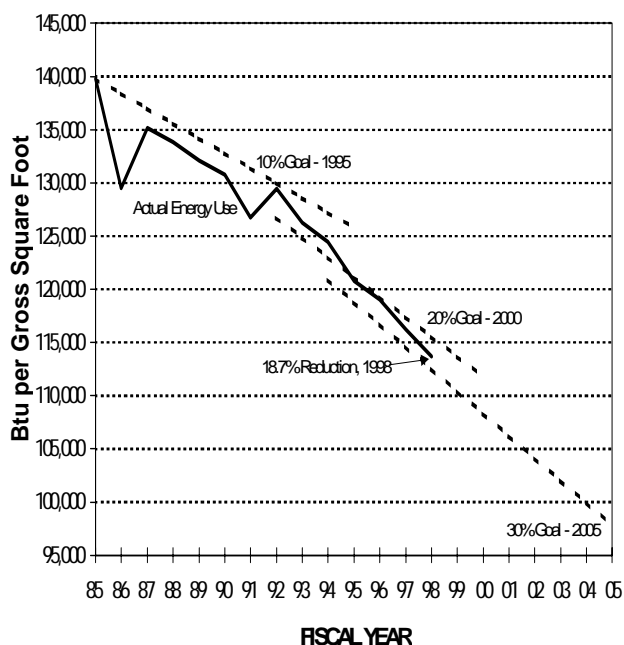
Electricity costs of \$2,562.3 million represent approximately 72.6 percent of total expenditures of \$3,530.3 million for buildings energy in FY 1998. Natural gas costs account for approximately 13.9 percent of the total, expenditures for fuel oil account for 5.4 percent, with the remaining 8.1 percent attributable to expenditures for LPG/propane, coal, purchased steam, and "other."

In FY 1998, the cost of all energy used in Federal buildings was \$1.15 per gross square foot. Of the \$1.15 spent per square foot Government-wide, \$0.83 was spent for electricity, \$0.16 was spent for natural gas, \$0.06 was spent for fuel oil, and the remaining \$0.10 was spent for purchased steam, coal, LPG/propane, and other fuels.

B. Progress Toward the Mandated Goals for Buildings and Facilities

Both the magnitude of energy consumption and the potential for energy savings have prompted legislative and executive branch initiatives to achieve energy conservation in the Federal buildings sector.¹⁴ Federal Government progress toward the 10, 20, and 30 percent energy reduction goals of NECPA and Executive Order 12902 is illustrated in Figure 8. Overall, the Federal Government reduced its net energy consumption in buildings and facilities by 18.7 percent in FY 1998 compared to FY 1985 when measured in terms of British Thermal Units consumed per gross square foot (Btu/GSF) of floor area.

FIGURE 8
Progress Toward the Energy Reduction Goals for
Federal Buildings and Facilities, FY 1985 through FY
1998



¹⁴The legislative authorities for Federal agencies are detailed in Appendix A.

Table 7-A shows the FY 1998 performance of the individual agencies in net Btu/GSF compared to FY 1985. Net Btu reflects the amount of energy delivered to the point of use and is used to measure agency performance toward the mandated goals.

Table 7-B shows the performance of the agencies measured in terms of primary Btu/GSF. Primary Btu represents the average amount of energy required at the source of generation (primary energy) rather than the actual Btu delivered to the site. Primary Btu includes energy resources used to generate, process, and transport electricity and steam. Measured in terms of source energy, the Federal Government shows a reduction of 4.4 percent in FY 1998 compared to FY 1985. This large difference from the net Btu/GSF reduction of 18.7 percent reflects the significant declines in direct use of fossil fuels and the offsetting increases in the share of the fuel mix contributed by electricity.

Contributing to the overall reduction of 18.7 percent in net Btu/GSF were the percentage reductions greater than 10 percent made by the following 14 agencies: the Departments of Agriculture, Defense, the Interior, Commerce, Energy, Justice, Veterans Affairs, Housing and Urban Development, Transportation, and the General Services Administration, National Aeronautics and Space Administration, Environmental Protection Agency, the Tennessee Valley Authority, and the United States Postal Service.

These agencies used a variety of strategies to reduce their energy consumption. Operations and maintenance (O&M) procedures continued to be emphasized as a major component in the effort to achieve the energy reduction goals. Improvements in energy efficiency were achieved through improved energy systems operations and both preventive maintenance and improved maintenance. O&M funding, used for the replacement of boilers, HVAC equipment, windows, and lighting systems, continued to benefit energy conservation.

In FY 1998, the implementation of many no-cost and low-cost energy conservation measures was continued, such as reducing lighting levels, lowering hot water temperatures, turning off unused equipment, and installing energy-efficient windows, insulation, weather stripping, and set-back thermometers.

Numerous energy-efficient building retrofits and energy conservation projects were undertaken to supplement the no-cost, low-cost measures. These initiatives can be categorized by lighting system replacement, HVAC equipment modernization, building envelope improvements, and other miscellaneous projects, such as installation of energy management control systems. Utility-sponsored demand side management programs were often pursued as supplemental sources of funding, as well as energy savings performance contract initiatives.

Other activities include energy awareness programs featuring energy awareness seminars, the identification of no-cost or low-cost measures, the designation of building energy monitors, publication of materials promoting energy efficiency, the procurement of energy-efficient goods and products, increased maintenance training, and increased engineering assistance.

TABLE 7-A
FEDERAL BUILDINGS AND FACILITIES NET ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 1998

	FISCAL YEAR 1985			FISCAL YEAR 1998			%CHANGE 1985-1998
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
VA	123,650.0	24,552.0	198,560	153,813.5	26,216.9	170,446	-14.2
DOE	73,415.8	32,923.2	448,449	81,253.9	23,126.7	284,623	-36.5
USPS	189,400.0	16,238.3	85,736	323,221.1	22,683.9	70,181	-18.1
GSA	196,341.4	16,563.0	84,358	186,125.0	13,123.7	70,510	-16.4
DOJ	20,768.8	6,112.0	294,289	44,240.1	7,783.0	175,926	-40.2
ST	2,597.0	232.1	89,390	44,905.6	7,422.7	165,296	84.9
HHS	22,317.3	5,837.3	261,558	26,115.9	6,953.1	266,239	1.8
NASA	11,509.1	3,095.7	268,977	19,789.5	3,941.4	199,164	-26.0
DOI	54,154.4	4,762.4	87,940	50,502.7	3,747.4	74,202	-15.6
DOT	32,007.8	4,500.3	140,599	33,582.2	3,667.9	109,220	-22.3
DOL	18,268.3	2,153.0	117,852	18,582.5	2,190.2	117,862	0.0
USDA	24,709.9	2,096.3	84,837	28,919.6	2,111.1	72,999	-14.0
TRSY	5,776.9	615.0	106,463	12,017.0	1,741.2	144,895	36.1
EPA	1,931.2	772.3	399,923	2,875.1	1,022.9	355,780	-11.0
TVA	4,886.6	402.4	82,357	9,747.9	658.4	67,539	-18.0
DOC	4,522.6	540.3	119,476	5,544.0	429.9	77,541	-35.1
HUD	1,432.0	116.9	81,668	1,432.0	103.1	71,998	-11.8
FCC	121.0	11.2	92,182	124.8	12.8	102,204	10.9
PCC	492.5	26.6	54,079	0.0	0.0	0	-100.0
OTHER*	2,558.5	369.0	144,232	16,762.0	1,898.7	113,276	-21.5
CIVILIAN AGENCIES							
TOTAL	790,861.1	121,919.5	154,160	1,059,554.4	128,834.8	121,593	-21.1
DOD	2,578,984.0	349,076.7	135,354	2,014,747.6	220,567.6	109,477	-19.1
TOTAL	3,369,845.1	470,996.2	139,768	3,074,302.0	349,402.4	113,653	-18.7

DATA AS OF 01/10/00

*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 7-B
FEDERAL BUILDINGS AND FACILITIES PRIMARY ENERGY USE
PER GROSS SQUARE FOOT, FY 1985 AND FY 1998

	FISCAL YEAR 1985			FISCAL YEAR 1998			%CHANGE 1985-1998
	GSF (Thousands)	BTU (Billions)	BTU/GSF	GSF (Thousands)	BTU (Billions)	BTU/GSF	
USPS	189,400.0	39,441.0	208,242	323,221.1	56,049.9	173,410	-16.7
DOE	73,415.8	57,430.1	782,258	81,253.9	48,980.3	602,806	-22.9
VA	123,650.0	42,333.7	342,367	153,813.5	48,899.3	317,913	-7.1
GSA	196,341.4	41,207.0	209,874	186,125.0	34,469.9	185,197	-11.8
ST	2,597.0	689.2	265,377	44,905.6	18,863.1	420,061	58.3
DOJ	20,768.8	8,962.7	431,545	44,240.1	15,263.0	345,004	-20.1
HHS	22,317.3	10,458.1	468,609	26,115.9	13,966.9	534,804	14.1
NASA	11,509.1	6,810.9	591,783	19,789.5	10,066.4	508,673	-14.0
DOT	32,007.8	8,298.7	259,270	33,582.2	8,547.1	254,512	-1.8
DOI	54,154.4	8,432.5	155,713	50,502.7	7,422.2	146,966	-5.6
USDA	24,709.9	4,347.2	175,929	28,919.6	4,969.0	171,820	-2.3
TRSY	5,776.9	1,451.0	251,178	12,017.0	4,553.5	378,918	50.9
DOL	18,268.3	3,687.8	201,871	18,582.5	4,109.4	221,145	9.5
TVA	4,886.6	1,321.0	270,333	9,747.9	2,220.2	227,759	-15.7
EPA	1,931.2	1,618.3	838,001	2,875.1	2,083.4	724,631	-13.5
DOC	4,522.6	1,189.1	262,925	5,544.0	1,207.8	217,860	-17.1
HUD	1,432.0	349.3	243,951	1,432.0	310.4	216,782	-11.1
FCC	121.0	29.5	244,132	124.8	31.7	253,838	4.0
PCC	492.5	90.5	183,854	0.0	0.0	0	-100.0
OTHER*	2,558.5	947.5	370,333	16,762.0	5,045.0	300,976	-18.7
CIVILIAN AGENCIES							
TOTAL	790,861.1	239,095.2	302,323	1,059,554.4	287,058.3	270,924	-10.4
DOD	2,578,984.0	581,170.2	225,349	2,014,747.6	428,492.1	212,678	-5.6
TOTAL	3,369,845.1	820,265.5	243,413	3,074,302.0	715,550.4	232,752	-4.4

DATA AS OF 01/10/00

*Other includes the Federal Trade Commission, Federal Emergency Management Agency, National Archives and Records Administration, National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Railroad Retirement Board, the U.S. Information Agency, and the Federal Energy Regulatory Commission.

Note: This table uses a conversion factor for electricity of 11,600 Btu per kilowatt hour and 1,390 Btu per pound of steam. Sum of components may not equal total due to independent rounding.

¹In 1998, the State Department developed a statistical method for estimating the energy consumption of its foreign buildings worldwide and included the estimate in their 1998 data. Foreign building consumption has not been reported in full in previous years.

Source: Federal Agency Annual Energy Management Data Reports

A number of agencies began submitting energy data to DOE starting in FY 1989 in compliance with NECPA as amended by the Federal Energy Management Improvement Act of 1988 (Pub. L. 100-615). Among these agencies are the Department of State, the Office of Personnel Management, and the Federal Energy Regulatory Commission. These three agencies submitted historical energy data back to FY 1985.

For FY 1990 and forward, Federal Energy Regulatory Commission energy consumption is reported as part of DOE and is therefore grouped under the category of "Other." Other agencies grouped under the category of "Other" in the tables had no buildings data to report for FY 1985. These agencies include the Federal Trade Commission, the National Archives and Records Administration, the Nuclear Regulatory Commission, the Railroad Retirement Board, and the U.S. Information Agency. The National Science Foundation, Federal Emergency Management Agency, and Office of Personnel Management also are grouped under this category due to lack of reporting in more recent years.

In FY 1998, GSA continued to delegate building management authority to agencies that occupy buildings owned and operated by GSA. As a result, several agencies reported increased gross square footage and energy consumption relative to FY 1985, while GSA reported decreases in these categories during the same period. The GSA delegation accounts for the significant inter-year changes in energy consumption reported by various individual agencies. Two agencies, the Department of Health and Human Services and the Department of Commerce, adjusted their baseline year consumption and GSF figures during FY 1988 to reflect GSA delegations. DOC added the Jeffersonville Federal Center to its data reports, which greatly increased its gross square footage. In addition, three Commerce Bureaus, the Bureau of Economic Affairs, the National Technical Information Service, and the Patent and Trademark Office, all became eligible for reporting in FY 1989 as a result of leasing delegation.

The Treasury Department's large increase in buildings energy consumption since FY 1985, is a result of the addition of the Internal Revenue Service delegated buildings to the Department's building inventory. Also contributing to the Treasury's increase was the additions, in FY 1989, of the Office of Thrift Supervision's square footage and the GSA delegation of building management authority for the Financial Management Service. The energy consumption and square footage for these delegated buildings were included in GSA's FY 1985 reports.

The State Department's increase of 84.9 percent is attributable to the addition of the complete Foreign Buildings Service inventory to State's gross square footage and consumption. This increased the State Department's square footage 17-fold in FY 1998 compared to FY 1985.

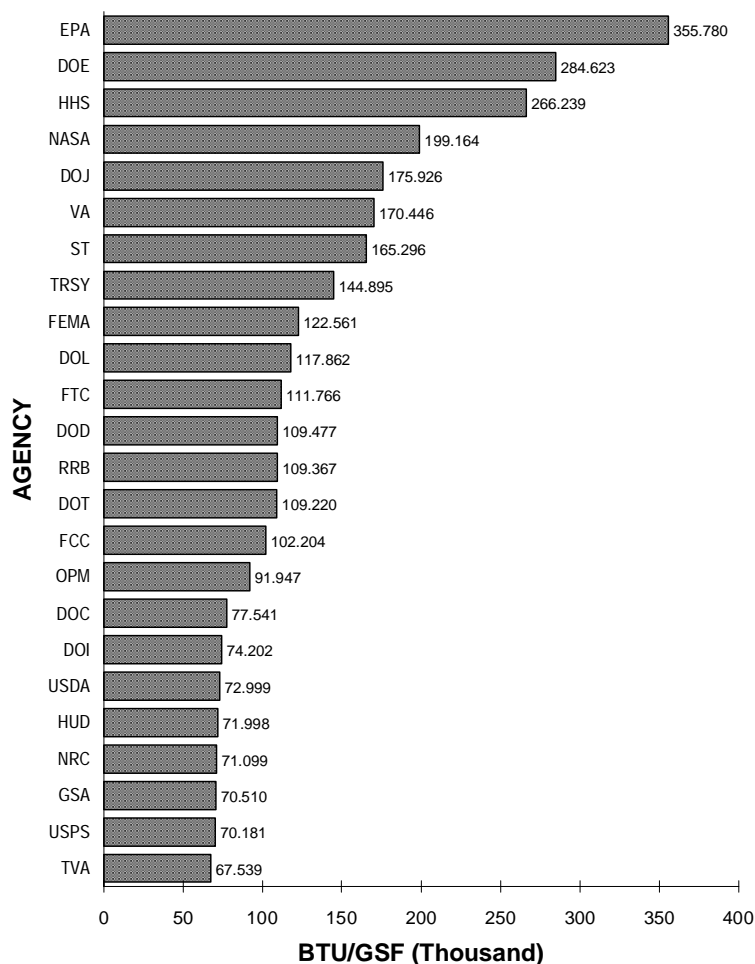
In FY 1998, the Department of Health and Human Services completed a study of its FY 1985 energy consumption baseline and determined that the validity of the energy consumption data from the National Institutes of Health (NIH) for FY 1985 was suspect. However, the data for FY 1986 was complete and accurate. Square footages figures for the two years did not vary significantly. Therefore, NIH concluded that the data for FY 1986 portrayed an accurate and logical baseline for the energy consumption on a square foot basis. In addition, the baseline for the Office of the Secretary, Hubert H. Humphrey Building, was also adjusted, to the data for FY 1987 to account for a shift in building operation to 24 hours per day. The result of these baseline

adjustments decreased the agency's FY 1985 baseline by 11 percent which in turn reflected a decrease in the agency's performance to the mandated reductions, despite the positive achievement of an 8 percent reduction in energy consumption from FY 1997 to FY 1998.

Figure 9 illustrates the range of energy intensity in agency buildings measured in terms of Btu/GSF.

High rates of energy intensity at the EPA, HHS, and DOE reflect the special requirements of their laboratory and research facilities. At DOE, if more than 80 percent of a facility's metered energy is dedicated to process operations, then the entire facility's energy is excluded from the buildings category, according to how DOE defines its buildings and facilities. A large part of the HHS building inventory consists of laboratory and hospital facilities. However, the agency currently includes 100 percent of its facilities in the buildings category, that is, no highly energy intensive square footage has been excluded. For example, the NIH represents 61 percent of energy consumed by HHS and 45 percent of the total agency square footage. The NIH Main Campus in Bethesda, Maryland represents 75 percent of the total NIH space. The campus consists of energy intensive hospitals, laboratories, and animal centers that, while predominantly designed and built two to five decades ago, are currently some of the most technically advanced medical facilities in the nation. These highly intensive facilities operate 24 hours per day. The Interior Department's relatively low Btu/GSF results from the lack of energy intensive activities (i.e., laboratories, hospitals, etc.) in space under its control. The wide range of rates of Btu/GSF among different agencies is a result of the varying missions of the agencies as well as their varying criteria for excluding energy intensive facilities.

FIGURE 9
Range of Energy Intensity (Btu/GSF) in Buildings and Facilities by Agency in FY 1998



C. ENERGY STAR® Program Participation

The Federal ENERGY STAR® Buildings Program Memorandum of Understanding (MOU) was signed by Mary Nichols, Environmental Protection Agency (EPA), and Christine Ervin,

Assistant Secretary for Energy Efficiency and Renewable Energy, Department of Energy, in March 1997.

During FY 1998, several Federal agencies took actions regarding both the Federal ENERGY STAR® Buildings and the Green Lights programs:

- Department of Defense—The Norfolk District, Army Corps of Engineers, in a joint demonstration with DOD and the EPA, developed a military housing design to achieve an "EPA 5 Star Energy Efficiency Rating" for 135 family housing units at Fort Lee, Virginia.
- Department of the Interior—In conjunction with EPA and DOE, DOI prepared a MOU to participate in the Federal ENERGY STAR® Program partnerships. This MOU was forwarded to the Interior's Assistant Secretary for Policy, Management and Budget.
- Department of Transportation—The United States Coast Guard is actively engaged in the development of eight ENERGY STAR® buildings that will become showcase buildings upon project completion.
- Environmental Protection Agency—Several EPA facility construction projects demonstrate ENERGY STAR® Buildings technologies and concepts including the New Headquarters Buildings (Washington, DC), the New Consolidated RTP Facility (Research Triangle Park, NC), the Region IV Science and Ecosystems Support Laboratory (Athens, GA), Region IV Office (Atlanta, GA), Region III Office (Philadelphia, PA), Region VII Central Regional Laboratory (Kansas City, KS), National Vehicle and Fuel Emissions Laboratory (Ann Arbor, MI), and the Fort Meade Environmental Science Center (Fort Meade, MD).
- Department of Health and Human Services—The HHS Energy Officer and the operating division energy coordinators met with EPA to discuss the Federal ENERGY STAR® Buildings program. Each HHS operating division will sign a MOU which will be forwarded to operating division heads with a cover letter encouraging participation from the Office of the Secretary's Assistant Secretary for Management and Budget.
- National Aeronautics and Space Administration—Both Goddard Space Flight Center and the Santa Susana Field Laboratory participate in the Green Lights program.
- Tennessee Valley Authority (TVA)—TVA is in the process of becoming a partner in the Federal ENERGY STAR® Buildings program. As a member of the Green Lights program, TVA developed the SWAP program to eliminate the cycle time for lighting upgrades and to reduce survey and design cost as part of these efforts. SWAP II, which will evaluate the implementation of lighting controls as a first step in the reduction of energy, will be initiated in FY 1998.
- United States Postal Service—Signed MOU with EPA to participate in the Federal ENERGY STAR® Buildings program.

D. Federal Building Energy Performance Standards

Federal agencies are subject to the provisions of 10 CFR part 435, subpart A, which set forth interim building energy performance standards for new Federal buildings. Standards for new Federal buildings are issued under the Energy Conservation Standards in New Buildings Act of 1976, as amended, 42 U.S.C. 6831 *et seq.*, and under Title V, subtitle H, of the Energy Security Act, 42 U.S.C. § 8286 and 8286a. On August 6, 1996, the Department of Energy issued a proposed rule in the *Federal Register*, 61 FR 40882, to revise the 1989 interim rule, 10 CFR part 435, which established energy efficiency voluntary performance standards for design of new Federal commercial and multi-family high-rise residential buildings.

EPACT mandates that new Federal buildings must contain energy saving and renewable energy specifications that meet or exceed the energy saving and renewable energy specifications of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)/ Illuminating Engineering Society of North America (IES) Standard 90.1-1989 and the Council of American Building Officials Model Energy Codes (MEC) 1992.

Furthermore, Executive Order 12902, which was designed to assist agencies in meeting or exceeding the Federal energy and water efficiency provisions contained in EPACT, requires each agency involved in the construction of a new facility that will be either owned by or leased to the Government to:

- (1) design and construct such facility to minimize the life-cycle cost of the facility by utilizing energy efficiency, water conservation, or solar or other renewable energy technologies;
- (2) ensure that the design and construction of facilities meet or exceed the energy performance standards applicable to Federal residential or commercial buildings as set forth in 10 CFR 435, local building standards, or a Btu-per-gross-square-foot ceiling as determined by the Task Force within 120 days of the date of this order, whichever will result in a lower life-cycle cost over the life of the facility;
- (3) establish and implement, within 270 days of the date of this order, a facility commissioning program that will ensure that the construction of such facilities meets the requirements outlined in this section before the facility is accepted into the Federal facility inventory; and
- (4) utilize passive solar design and adopt active solar technologies, where cost-effective.

The Department of Energy has endeavored to fulfill these requirements by developing common energy conservation standards for all new Federal buildings and by issuing life-cycle costing procedures for use by Federal agencies in the assessment of energy conserving investments for existing buildings.

In response to the Executive Order 12902 requirement for Federal agencies to establish and implement a facility commissioning program, DOE formed the New Space Working Group under the Federal Interagency Energy Management Task Force. The Working Group, in conjunction with GSA and other Federal agencies, drafted a *Building Commissioning Guide*

which has been distributed to agencies for final comment. The *Guide* is designed to help all parties involved in the planning, design, construction, acceptance, and post-acceptance phases work together to produce a building that operates according to design intent and provides occupant comfort and energy savings. The draft *Guide* will be posted on the Federal Energy Management Program's Internet Web site at www.eren.doe.gov/femp for use during the review process.

A proposed rule, *Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings*, revises the interim Federal standards to conform generally with the codified version of ASHRAE Standard 90.1-1989 and incorporates changes in the areas of lighting, mechanical ventilation, motors, building envelope, and fenestration rating procedures, and test procedures for heating and cooling equipment. Since Standard 90.1-1989 is written as a standard of professional practice, it cannot be directly adopted as a building code. DOE's New Space Working Group expressed concern that the *Energy Code* be concise as possible, publishing the minimal exceptions to the commercial standard, rather than publishing an entire new energy code. Using one standard would allow the architect/engineer community to focus on designing energy saving elements, rather than on implementing a unique Federal standard. The Working Group also recommended that an electronic version of the codified rule be placed on the Internet. The final version of the *Energy Code* is expected to be published by DOE in 2000.

A separate proposed rule for new Federal residential buildings was issued by the Department of Energy in the *Federal Register* in May 1997. The proposed rule, *Energy Code for New Federal Residential Buildings*, uses the Model Energy Code (MEC) format and contains performance standards from the current Federal residential standard, the MEC, and the codified version of ASHRAE Standard 90.2-1993 that are economically justified and technologically feasible.

DOE has also worked closely with HUD in coordinating the technical factors and data used to develop HUD's Manufactured Housing Standards and has committed to work closely with all Federal agencies to coordinate and upgrade the standards applied by these agencies to non-Federal buildings.

DOE is concurrently working on a model commissioning plan based on a GSA plan for a Federal courthouse in Portland, Oregon. This model will be more detailed than the *Building Commissioning Guide* and will include forms, model plans, training, and acceptance procedures for the building.

III. ENERGY INTENSIVE OPERATIONS IN FEDERAL FACILITIES

A. Energy Consumption and Costs for Energy Intensive Operations

NECPA, as amended, 42 U.S.C. § 8253, allows agencies to exclude from the buildings goal, facilities which house energy intensive activities. The energy consumed in these facilities is reported under the category of excluded/process energy. The reporting of energy used in excluded buildings assures that total Federal energy consumption is monitored.

The designation of excluded buildings is at the discretion of each agency. Currently, 14 agencies are excluding specific facilities from the NECPA goal: the Departments of Agriculture, Commerce, Defense, Energy, Justice, State, Transportation, and the Treasury, the General Services Administration, the National Aeronautics and Space Administration, the National Archives and Records Administration, the Social Security Administration, the Tennessee Valley Authority, and the U.S. Information Agency. Lists of the excluded buildings that have been identified by the agencies are included in Appendix D.

Table 8 shows that fuels consumed by excluded/process energy have increased 66.6 percent compared to FY 1985 and 0.7 percent from FY 1997. During FY 1998, the Department of Defense consumed 36.6 trillion Btu of excluded/process energy, 55.5 percent of all excluded/process energy used by the Federal Government.

Some of the fluctuations in consumption of excluded/process energy resulted from agencies changing data collection and reporting procedures. The Social Security Administration began reporting its energy separately from the Department of Health and Human Services in FY 1996 and has elected to exclude check processing facilities as energy intensive. In FY 1994, the Tennessee Valley Authority began reporting electricity used for certain processes of its generating plants. The Department of Justice also commenced reporting energy consumption in its excluded buildings during FY 1994. Increases in consumption of excluded/process energy compared to FY 1985 is also partially attributable to DOD's reallocation, beginning in the FY 1988 reporting year, of energy previously reported in the buildings category to the process category. Also contributing to this increase was the Treasury Department's initial reporting of process energy in FY 1991. Treasury neither reported process energy prior to 1991 nor revised its building energy consumption prior to 1990 to exclude process energy. NASA began reporting process energy in FY 1989 and has revised its prior year data. As a result of the prioritization survey required by Executive Order 12902, NASA redesignated the entire Dryden Flight Research Center, virtually all of the White Sands Test Facility, and many individual facilities at the Goddard Space Flight Center and the Langley Research Center as non-exempt facilities in FY 1996. NASA also redesignated the entire Michoud Assembly Facility as an industrial facility. USIA also began reporting energy under this category in FY 1989. USIA has not reported any process energy consumption for any prior years. GSA began reporting energy in excluded buildings in FY 1990 and has backed out this energy consumption from its FY 1985 buildings data. The Departments of Agriculture and Commerce both began excluding buildings where energy intensive activities occur in FY 1992. USDA revised all of its prior year buildings data back to FY 1985 to reflect the exclusion of the Agricultural Research Service. The Commerce

TABLE 8
FEDERAL NET ENERGY CONSUMPTION IN EXCLUDED BUILDINGS/PROCESS OPERATIONS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
DOE	16,401.6	11,649.9	11,541.3	12,657.8	10,900.5	11,000.3	17,236.2	16,876.6	8,209.1	6,367.8	-61.2	-22.4
NASA	5,759.6	7,135.0	7,215.7	7,327.6	7,310.3	7,590.9	7,172.0	6,210.8	6,482.8	6,347.4	10.2	-2.1
DOT	2,885.1	3,064.0	3,323.0	4,406.8	4,703.8	2,952.5	2,349.4	3,178.1	3,024.6	4,799.4	66.4	58.7
USDA	1,942.8	2,204.2	2,133.3	1,966.3	2,166.9	2,119.3	2,824.0	2,140.8	2,221.6	2,416.5	24.4	8.8
USPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,974.4	2,026.2	0.0	2.6
DOC	938.6	0.0	0.0	976.6	770.8	1,110.2	1,627.4	1,823.0	1,335.2	1,332.0	41.9	-0.2
TVA	0.0	0.0	0.0	0.0	0.0	1,390.6	1,317.1	1,235.6	1,251.8	1,208.4	0.0	-3.5
USIA	0.0	1,406.9	850.6	828.5	796.8	861.1	878.2	936.2	1,092.2	1,020.4	0.0	-6.6
TRSY	0.0	0.0	1,026.8	814.1	923.7	771.8	941.0	928.3	1,131.8	996.5	0.0	-11.9
DOJ	0.0	0.0	0.0	0.0	0.0	668.4	707.8	944.1	846.9	850.7	0.0	0.5
GSA	623.6	160.6	746.2	677.6	994.6	1,060.2	1,213.8	961.0	890.7	849.2	36.2	-4.7
NARA	0.0	0.0	0.0	0.0	274.7	610.7	792.2	562.9	572.7	591.8	0.0	3.3
ST	0.0	0.0	0.0	0.0	337.4	339.4	344.4	364.1	339.1	324.2	0.0	-4.4
SSA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	215.5	204.7	211.4	0.0	3.3
PCC	167.2	190.8	197.1	193.9	197.5	201.3	209.4	218.6	221.2	0.0	-100.0	-100.0
CIVILIAN AGENCIES TOTAL	28,718.3	25,811.3	27,033.9	29,849.3	29,377.0	30,676.5	37,612.7	36,595.7	29,798.8	29,342.0	2.2	-1.5
DOD	10,857.2	39,209.1	56,372.1	67,913.1	41,159.3	39,781.4	37,962.6	37,260.1	35,702.3	36,588.4	237.0	2.5
ALL AGENCIES TOTAL	39,575.5	65,020.5	83,406.1	97,762.4	70,536.3	70,457.9	75,575.3	73,855.8	65,501.1	65,930.5	66.6	0.7
MBOE	6.8	11.2	14.3	16.8	12.1	12.1	13.0	12.7	11.2	11.3		
Petajoules	41.8	68.6	88.0	103.1	74.4	74.3	79.7	77.9	69.1	69.6		

DATA AS OF 01/10/00

Note: This table uses a conversion factor for electricity of 3,412 Btu per kilowatt hour.
Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

Department revised its FY 1985 base year data only to reflect the exclusion of its energy intense facilities. The State Department and NARA began reporting excluded/process energy in FY 1993 and have not revised data for any prior years. The Justice Department commenced reporting of excluded buildings in FY 1994 and has not revised data for any prior years. The U.S. Postal Service began reporting energy consumption under this category in FY 1997 with no revisions to prior years.

Energy used in energy intensive operations accounts for approximately 6.3 percent of the total 1.04 quads used by the Federal Government. Electricity constitutes 52.9 percent of the energy used in energy intensive operations, 27.4 percent is accounted for by natural gas, 7.2 percent by coal, and 9.4 percent by fuel oil. Small amounts of purchased steam, liquefied petroleum gas (LPG)/propane, and "other" energy account for the remaining 3.1 percent.

The energy used in energy intensive operations in FY 1998 accounted for approximately 7.5 percent of the total Federal energy bill. Table 9 shows that the Federal Government spent approximately \$621.3 million for excluded/process energy during the fiscal year. The combined cost of excluded/process energy in FY 1998 was \$9.42 per million Btu, down 8.5 percent from the combined cost of \$10.29 reported in FY 1997 (see Appendix C).

B. Statutory Background and Progress Toward Goals for Industrial Facilities

Under section 543(a)(2) of NECPA, as amended by EPACT, 42 U.S.C. § 8253, buildings that house energy-intensive activities may be excluded from NECPA's performance goal for buildings. These buildings are listed in Appendix D. Most energy used in excluded buildings is process energy. Process energy is consumed in industrial operations, certain R&D activities, and in electronic-intensive facilities.

Executive Order 12759 expanded the scope of Federal energy management activities beyond the NECPA mandates by establishing goals for industrial operations. It required industrial facilities to increase energy efficiency by at least 20 percent by FY 2000 in comparison to FY 1985 to the extent that measures undertaken are cost-effective and minimize life-cycle costs. Executive Order 12902 changes this goal to require an increase in energy efficiency by at least 20 percent by 2005 as compared to 1990. Measures undertaken to achieve this goal must be cost-effective, and agencies are also directed to implement all cost-effective water conservation projects. The Executive Order goal applies to certain buildings currently excluded under NECPA where industrial operations are performed. During FY 1994, a working group of the Interagency Energy Management Task Force concentrated efforts on developing appropriate indicators for measuring performance under this goal.

The Department of Defense excludes two types of energy from the NECPA performance goal: process energy and "cold iron" energy. Process energy is used in facilities that perform production or industrial functions. "Cold iron" energy is used to supply power to Navy ships docked in port. Both types of energy are included in this report under the category of excluded/process.

TABLE 9
DEFENSE AND CIVILIAN FEDERAL COSTS FOR EXCLUDED BUILDINGS/
PROCESS ENERGY IN FY 1998
(In Millions of Dollars)

	ELECTRICITY	FUEL OIL	NATURAL GAS	LPG/ PROPANE	COAL	PURCHASED STEAM	OTHER	TOTAL
DEFENSE ¹	193.843	12.071	38.849	0.316	7.985	4.656	0.000	257.719
CIVILIAN ²	323.573	8.224	20.288	0.426	0.591	10.106	0.410	363.619
TOTAL	517.416	20.295	59.137	0.742	8.576	14.761	0.410	621.337

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

ELECTRICITY	=	50.58 / MWH
FUEL OIL	=	0.45 / GALLON
NATURAL GAS	=	3.38 / THOUSAND CUBIC FEET
LPG/PROPANE	=	0.50 / GALLON
COAL	=	44.54 / SHORT TON
PURCHASED STEAM	=	7.94 / MILLION BTU
OTHER	=	7.89 / MILLION BTU

DATA AS OF 07/10/98

¹Includes DOD costs for process and cold iron energy.

²Includes DOE costs for metered process energy and energy costs for buildings excluded from performance measurement by DOC, DOJ, DOT, GSA, NASA, NARA, PCC, SSA, STATE, TRSY, TVA, USDA, and USIA.

Note: Sum of components may not equal total due to independent rounding.

Source: Annual energy cost data submitted to DOE by Federal agencies.

The Department of Energy reports its use of metered energy in extensive experimental research and production processes under excluded/process energy. The metered process energy used by DOE includes energy consumed in: production nuclear reactors, industrial-type operations for weapons and nuclear fuel production, and research and development facilities such as experimental nuclear reactors and linear accelerators. Excluded/process energy totaled almost 6.4 trillion Btu in FY 1998, which represents 20.2 percent of all energy consumed by DOE. The use of excluded process energy by DOE in FY 1998 was 61.2 percent less than in FY 1985, and 22.4 percent less than FY 1997. The primary contributor to the substantial drop beginning in FY 1997 was the sale by DOE of the Naval Petroleum Reserve, California, and subsequent decreases in natural gas consumption.

NASA excludes from the NECPA performance goal facilities which fall under its definition of mission-variable facilities. These highly specialized, energy-intensive facilities house space science experimental and testing activities, as well as some industrial operations. Examples of these facilities include wind tunnels driven by multi-thousand horsepower electric motors, launch facilities, space simulation chambers, space communication facilities, and research analysis centers. The Michoud Assembly Facility (MAF), which manufactures the Space Shuttle external tank, is the only NASA facility subject to the Executive Order goal for industrial facilities. MAF selected billion Btu (BBtu) per external tank as its industrial energy metric. In the FY 1990 baseline year, MAF total energy consumption was 925.8 BBtu at a production rate of 4.6 external tanks per year, or 201.3 BBtu/external tank. In FY 1998, MAF total energy consumption was 1,008 BBtu at a production rate of 7 external tanks per year, or 144 BBtu/external tank. This represents a 28.5 percent reduction in energy consumption per external tank produced and an energy efficiency improvement of 39.8 percent.

The Department of Commerce excludes buildings operated by three of its agencies: the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the Bureau of the Census. NIST installations have been excluded because they are comprised of general purpose and special laboratories that require constant environmental space control and base electrical loads for scientific equipment and computer systems. NOAA Weather Service facilities operate 24 hours a day and consist of radar towers, computers, special gauges, meters and other sophisticated equipment. Marine Fisheries and Laboratories conduct marine biology research and utilize refrigerators, freezers, incubators, coolers, seawater pumps, and compressors that operate 24 hours a day. The Bureau of Census Charlotte Computer Center is a leased facility and is used solely as a computer center. The building is operated 24 hours a day.

Within the Department of Transportation, the Federal Aviation Administration excludes all buildings involved in implementing the National Airspace System Plan. These buildings house energy-intensive electronic equipment with the associated HVAC requirements to maintain an environment for reliable equipment operation.

The U.S. Information Agency designates domestic and overseas Voice of America Relay Stations as energy-intensive facilities and reports this consumption as process energy excluded from the NECPA performance goal.

A substantial amount of the energy consumption formerly reported by the Panama Canal Commission under this category was dedicated to process functions, primarily comprising the locks, industrial, and other canal ancillary or support facilities. PCC has ceased reporting energy data pending its abolishment on December 31, 1999.

The GSA excludes from the NECPA performance goal those buildings and facilities where energy usage is skewed significantly due to reasons such as: buildings entering or leaving the inventory during the year; buildings down-scaled operationally to prepare for disposal; buildings undergoing major renovation and/or major asbestos removal; or buildings functions like that of outside parking garages which consume essentially only lighting energy, yet are classed as buildings. GSA's excluded buildings, due to these factors, could distort GSA's actual progress toward meeting the energy reduction goal.

Energy reported by the Treasury Department under the category of excluded/process energy is comprised mainly of industrial energy consumption by the Bureau of Engraving and Printing and the Mint.

The State Department excludes unique, special-use facilities with special security and operational requirements including the President's guest house, a computer facility, the International Chancery Center, and the Main State Facility.

NARA designates all 12 of its facilities as energy intensive because of stringent records storage requirements which demand that documents and records be maintained in a controlled environment 24 hours per day, 365 days per year.

The Department of Justice excludes the Justice Data Center in Washington, DC, a 24-hour-a-day energy intensive facility and five installations operated by the Federal Bureau of Investigation which operate 24 hours per day. These facilities have limited conservation measures available. Also exempted by the Justice Department are Immigration and Naturalization Service repeater stations located nationwide that house equipment operations only.

The Social Security Administration, which began reporting energy consumption this year as an independent agency, has designated its National Computer Center as an energy intensive facility. The Center contains SSA's main database and query server and operates 24 hours per day and 365 days per year.

Since 1985, the Postal Service has deployed energy intensive automated equipment which has improved the efficiency of mail operations. Surveys indicate that this equipment deployment has increased process energy usage by 8 percent in FY 1998. The Postal Service energy consumption reported under this category reflects process energy consumed by mail processing equipment. This consumption has been factored out of energy consumption of Postal Service non-excluded buildings in order to provide a better measure of their energy efficiency status.

IV. ENERGY MANAGEMENT IN VEHICLES AND EQUIPMENT

A. Energy Consumption and Costs for Vehicles and Equipment

Vehicle and equipment energy consists of energy used by equipment ranging in size and function from aircraft carriers to forklifts. It includes aircraft and naval fuels, automotive fuels consumed by Federally-owned and leased vehicles and privately-owned vehicles used for official business, and the energy used in Federal construction.

Table 10 shows that in FY 1998, the Federal Government used approximately 627.7 trillion Btu of energy for vehicles and equipment, a decrease of 32.8 percent relative to FY 1985. DOD's vehicle and equipment energy consumption decreased 34.9 percent from FY 1985, while the civilian agencies increased consumption by 9.4 percent. Overall, vehicle and equipment consumption decreased 5.7 percent from FY 1997. Federal energy consumption in vehicles and equipment is at its lowest level since Federal agencies began reporting consumption in 1975. This is mainly attributable to decreased operations by the Department of Defense.

Jet fuel consumption accounted for 71.0 percent of all vehicle and equipment energy in FY 1998. In FY 1998 compared to the previous year, jet fuel consumption decreased 6.3 percent from 475.7 trillion Btu to 445.5 trillion Btu.

Agencies have taken many tangible steps to keep the use of vehicle fuels to a minimum. For example, USPS continues to modernize its fleet, adding diesel delivery vans and long-life vehicles to its inventory, both of which are more fuel efficient than the older vehicles they replaced. DOD continues to increase the use of flight simulators, as well as the use of new propulsion technologies in order to lessen the growth of vehicle and equipment fuel consumption.

Increased mission activities accounted for higher levels of operations energy use by some agencies. The Commerce Department's significant increase in consumption during FY 1990 was due primarily to increased miles driven by Census personnel in conducting the 1990 Census. Energy consumption in DOC's vehicles has declined by 80.7 percent in FY 1998 from FY 1990.

Other fluctuations in consumption of vehicle fuels resulted from changes in data collection and reporting procedures. The significant decrease in vehicular fuel consumption compared to FY 1985 reported by the Department of Health and Human Services is the result of data collection difficulties which omitted from their reports fuel consumed by leased vehicles and privately-owned vehicles authorized for Government service after FY 1987. HHS reported no vehicles under the agency's control during FY 1990, FY 1991, and FY 1992.

TABLE 10
FEDERAL ENERGY CONSUMPTION IN VEHICLE AND EQUIPMENT OPERATIONS
(In Billions of Btu, with Conversions to Millions of Barrels of Oil Equivalent [MBOE], and Petajoules [Joule x 10¹⁵])

CIVILIAN AGENCY	FY 1985	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	%CHANGE 85-98	%CHANGE 97-98
USPS	11,524.2	12,136.2	12,196.2	12,225.0	12,565.3	13,348.6	14,571.2	14,217.1	16,779.2	15,166.8	31.6	-9.6
DOT	11,957.0	12,150.8	12,350.7	8,702.6	10,769.7	12,917.0	12,193.7	12,222.9	12,347.9	10,145.0	-15.2	-17.8
DOJ	2,064.0	2,097.9	2,124.0	3,675.1	2,835.9	3,451.3	3,181.6	3,693.0	3,149.3	7,171.4	247.5	127.7
USDA	4,319.6	4,952.3	5,123.8	4,982.7	4,931.2	5,129.1	4,821.7	4,654.8	3,153.0	3,389.4	-21.5	7.5
DOI	3,053.9	3,352.5	3,208.6	3,819.1	3,507.8	3,970.0	2,782.2	1,347.5	2,943.7	2,679.9	-12.2	-9.0
TRSY	2,155.0	1,473.2	1,655.7	2,065.2	2,420.9	2,161.8	1,773.4	1,350.9	1,561.4	2,078.6	-3.5	33.1
DOE	2,946.7	2,520.4	2,559.7	2,078.1	2,241.3	2,085.9	1,841.9	1,561.0	1,971.0	1,955.6	-33.6	-0.8
NASA	1,972.7	1,736.7	1,864.0	1,875.4	1,798.0	1,734.9	1,757.0	1,539.3	1,622.1	1,428.3	-27.6	-11.9
VA	592.8	518.3	317.4	634.9	663.9	374.4	353.6	660.7	1,199.1	1,380.3	132.9	15.1
DOC	1,010.2	3,100.3	1,315.2	952.5	995.7	995.2	760.6	570.1	929.1	708.4	-29.9	-23.7
HHS	373.3	0.0	0.0	0.0	177.3	176.3	105.5	18.6	435.0	447.7	19.9	2.9
TVA	578.5	476.6	534.7	408.8	452.4	480.3	541.7	583.8	479.5	429.1	-25.8	-10.5
DOL	232.2	239.0	401.9	388.7	369.1	369.6	356.9	337.7	336.2	350.2	50.8	4.2
GSA	144.1	128.1	122.6	102.9	79.6	69.9	91.3	98.8	119.9	123.3	-14.4	2.8
EPA	132.2	0.0	0.0	0.0	100.7	97.8	99.5	76.3	136.8	97.7	-26.1	-28.6
ST	14.8	34.9	0.0	0.0	7.5	0.0	0.0	0.0	44.7	40.9	177.0	-8.5
HUD	0.0	0.0	32.7	33.6	31.6	30.7	25.4	25.4	28.3	23.3	0.0	-17.5
FCC	12.4	9.1	7.2	7.5	7.2	6.6	6.6	4.8	7.1	6.6	-46.7	-6.9
PCC	530.4	653.7	578.6	699.6	684.9	688.4	866.7	829.7	766.8	0.0	-100.0	-100.0
OTHER*	39.2	69.6	27.6	113.6	106.7	105.4	119.6	116.9	140.1	147.6	276.3	5.4
CIVILIAN AGENCIES												
TOTAL	43,653.1	45,649.7	44,420.7	42,765.2	44,746.7	48,193.3	46,250.1	43,909.3	48,150.2	47,770.2	9.4	-0.8
DOD												
	890,679.9	881,345.1	926,033.6	740,357.2	727,887.1	674,597.5	640,893.4	631,202.0	617,235.4	579,959.8	-34.9	-6.0
ALL AGENCIES												
TOTAL	934,333.0	926,994.8	970,454.3	783,122.4	772,633.7	722,790.8	687,143.4	675,111.3	665,385.6	627,729.9	-32.8	-5.7
MBOE	160.4	159.1	166.6	134.4	132.6	124.1	118.0	115.9	114.2	107.8		
Petajoules	985.7	977.9	1,023.8	826.2	815.1	762.5	724.9	712.2	702.0	662.2		

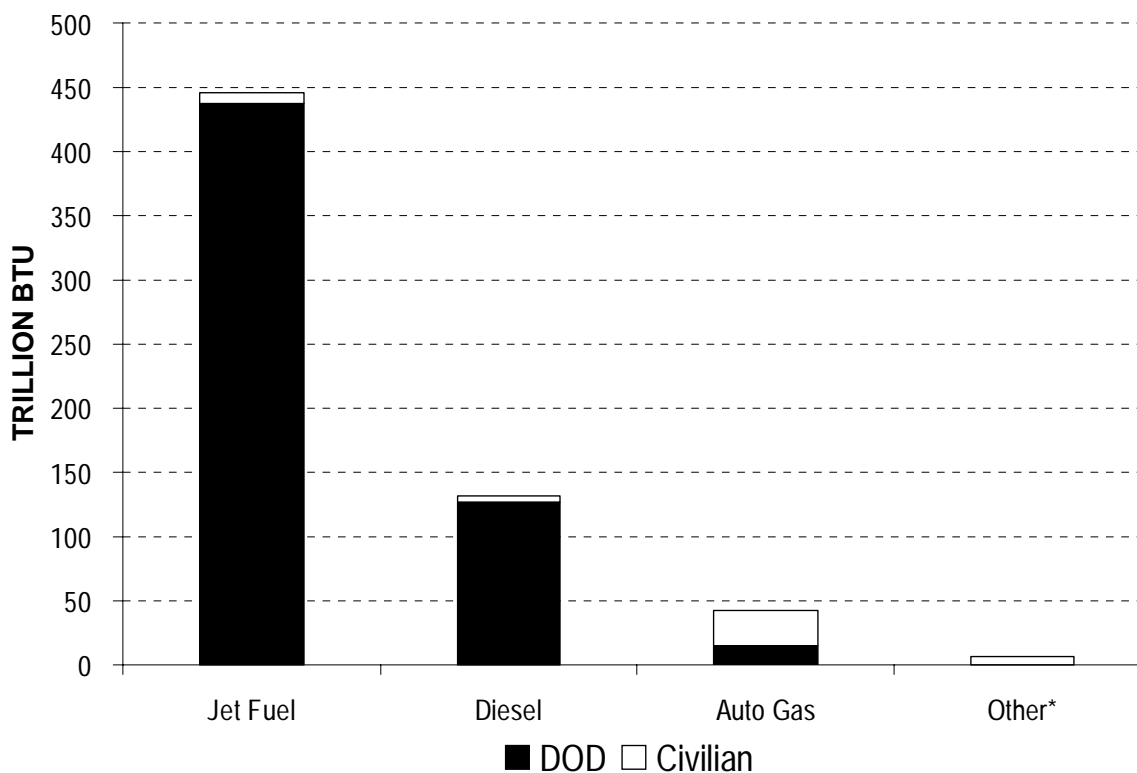
DATA AS OF 01/10/00

*Other includes for certain years the CFTC, CIA, FEMA, HUD, NSF, NRC, OPM, and USIA.

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

FIGURE 10
Defense and Civilian Federal Energy Consumption in
Vehicles and Equipment by Fuel Type, FY 1998



*Other includes navy special, aviation gas, and LPG/propane

Figure 10 depicts the vehicles and equipment fuel mix within DOD and civilian agencies. Jet fuel accounts for 445.5 trillion Btu or 71.0 percent of the total energy usage in the category, with 21.1 percent attributed to diesel and distillate fuel, 6.9 percent to auto gasoline, and 1.1 percent to aviation gasoline, navy special, LPG/propane and other fuels, combined.

As shown in Tables 11-A and 11-B, the Federal Government spent \$4,346.4 million on vehicles and equipment energy in FY 1998, 6.7 percent more than the FY 1997 expenditure of \$4,073.3 million constant dollars. In FY 1998, the combined price for all types of vehicles and equipment energy was \$6.92 per million Btu, up 13.1 percent from FY 1997. The average real cost of gasoline to the Federal Government declined from \$1.06 per gallon in FY 1997 to \$1.03 in FY 1998. The unit cost for diesel/distillate fuel increased 8.8 percent while the unit cost for jet fuel rose 14.8 percent.

When compared to FY 1985 using constant 1998 dollars, energy costs for vehicles and equipment decreased 50.0 percent from \$8,700.3 million to \$4,346.4 million in FY 1998. During that same period, the Government's combined cost for vehicles and equipment energy, in constant dollars, fell 25.6 percent from \$9.31 per million Btu to \$6.92 per million Btu.

Vehicle and equipment fuel costs in FY 1998 represent 51.1 percent of the Government's total energy costs of \$8.3 billion.

TABLE 11-A
DEFENSE AND CIVILIAN FEDERAL COSTS FOR VEHICLE AND EQUIPMENT
ENERGY IN FY 1998
(In Millions of Dollars)

	AUTO GAS	DIST. DIESEL	LPG/ PROPANE	AVIATION GAS	JET FUEL	NAVY SPECIAL	OTHER	TOTAL
DEFENSE	121.041	791.847	0.612	0.011	3,050.483	0.000	1.347	3,965.341
CIVILIAN	234.744	37.750	3.241	2.959	62.532	0.000	39.838	381.064
TOTAL	355.785	829.597	3.853	2.970	3,113.015	0.000	41.185	4,346.405

AVERAGE COST PER UNIT, BASED ON REPORTS FROM AGENCIES

AUTO GAS = 1.03 / GALLON
DIST/DIESEL = 0.87 / GALLON
LPG/PROPANE = 0.94 / GALLON
AVIATION GAS = 1.77 / GALLON
JET FUEL = 0.91 / GALLON
NAVY SPECIAL = 0.00 / GALLON
OTHER = 6.60 / MILLION BTU

DATA AS OF 01/10/00

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

TABLE 11-B
CONSUMPTION AND COSTS OF VEHICLE AND EQUIPMENT
ENERGY BY FUEL TYPE IN FY 1998, FY 1997, AND FY 1985
(Constant 1998 Dollars)

ENERGY TYPE	BILLIONS OF BTU	COST PER MMBTU	COST (IN MILLIONS OF DOLLARS)
FY 1998			
AUTO GASOLINE	43,050.5	8.2644	355.785
DIST/DIESEL	132,313.3	6.2699	829.597
LPG/PROPANE	393.0	9.8035	3.853
AVIATION GASOLINE	209.9	14.1462	2.970
JET FUEL	445,520.3	6.9874	3,113.015
NAVY SPECIAL	0.0	0.0000	0.000
OTHER	6,242.9	6.5971	41.185
TOTAL	627,729.9		4,346.405
AVERAGE COST PER MMBTU = \$6.924			
FY 1997			
AUTO GASOLINE	39,047.5	8.5085	332.234
DIST/DIESEL	135,846.0	5.7647	783.117
LPG/PROPANE	18.7	8.7281	0.164
AVIATION GASOLINE	253.7	14.7634	3.744
JET FUEL	475,672.5	6.0876	2,895.713
NAVY SPECIAL	0.0	0.0000	0.000
OTHER	14,547.2	4.0117	58.360
TOTAL	665,385.6		4,073.332
AVERAGE COST PER MMBTU = \$6.122			
FY 1985			
AUTO GASOLINE	50,481.7	10.8466	547.557
DIST/DIESEL	169,217.9	8.6561	1,464.773
LPG/PROPANE	149.3	10.0607	1.502
AVIATION GASOLINE	1,882.3	16.0230	30.159
JET FUEL	705,675.5	9.3539	6,600.802
NAVY SPECIAL	6,687.7	8.0275	53.686
OTHER	238.6	7.7387	1.846
TOTAL	934,333.0		8,700.327
AVERAGE COST PER MMBTU = \$9.311			

DATA AS OF 01/10/00

Note: Sum of components may not equal total due to independent rounding.

Source: Federal Agency Annual Energy Management Data Reports

B. Alternative Fuel Vehicles

An alternative fuel vehicle (AFV) can be manufactured as an AFV or converted to an AFV as either a bi-fuel, flexible fuel, or dedicated vehicle. A bi-fuel vehicle has the ability to operate on either an alternative fuel or gasoline, whereas a flexible fuel vehicle has the ability to operate on a mixture of alternative fuel and petroleum-based fuels. Dedicated vehicles are designed to operate only on alternative fuel. The alternative fuels currently used by Federal agencies are: M-85 (85 percent methanol, 15 percent gasoline), E-85 (85 percent ethanol, 15 percent gasoline), CNG (compressed natural gas), LNG (liquefied natural gas), LPG (liquefied petroleum gas), and electricity.

The U.S. Postal Service continues to operate the largest CNG fleet in the country. Since 1989, 7,678 vehicles have been converted to compressed natural gas. Most USPS AFVs are dual-fueled (gasoline and CNG). USPS acquired two electric vehicles in FY 1998 in joint efforts with the Department of Energy and under contract with Ford Motor Company and General Motors Corporation-Hughes. USPS engineering staff, in cooperation with other Federal agencies and private industry, continues to evaluate electric and alternative fuel technologies as they become available.

Section 308 of Title III of EPACT, 42 U.S.C. § 13217, requires agencies to measure the aggregate percentage of alternative fuel use in dual-fueled vehicles in their fleets. In an effort to better fulfill this reporting requirement, vehicle fleet managers and representatives from DOE, GSA, and other agencies conducted coordinating meetings during FY 1996 on this issue. These meetings resulted in a revised GSA Agency Report of Motor Vehicle Data (form SF-82) for collecting acquisition, fuel consumption, and fuel cost data for non-tactical motor vehicles. The revised SF-82 was distributed by GSA to agency fleet managers beginning in FY 1997. GSA compiled this data for FY 1998, including alternative fuel consumption data reported under Sections 303 and 308 of EPACT, and forwarded this information to DOE for inclusion in the Annual Report to Congress.

As shown in Table 12, the Federal Government consumed 576.4 billion Btu of alternative fuels in non-tactical vehicles during FY 1998. This is equivalent to 4.6 million gallons of gasoline. Alternative fuel consumption comprises 0.1 percent of the energy used in all Government vehicles and equipment. When compared with Federal consumption of automobile gasoline, alternative fuels comprise 1.3 percent of this energy use.

TABLE 12
FEDERAL AGENCY CONSUMPTION OF ALTERNATIVE FUELS
IN NON-TACTICAL VEHICLES, FY 1998
(In Billions of Btu)

	CNG	E-85	Electricity	M-85	LPG/ Propane	Biodiesel	Hydrogen	Total
USPS	389.59	0.00	0.01	0.00	0.00	0.00	0.00	389.60
DOD	127.59	32.15	7.73	4.21	1.55	0.00	0.05	173.27
DOE	6.07	0.00	0.00	0.00	0.00	0.00	0.00	6.07
USDA	0.25	3.84	0.11	0.00	0.00	0.00	0.00	4.21
Treasury	0.28	0.82	0.00	0.13	0.07	0.00	0.00	1.29
Labor	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.91
Interior	0.28	0.00	0.00	0.02	0.04	0.00	0.00	0.34
Justice	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.27
VA	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.15
DOT	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.13
EPA	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.08
SSA	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
NASA	3.60	0.00	0.00	0.00	0.20	0.00	0.00	0.00
TOTAL	528.65	37.37	7.86	4.36	1.86	0.05	0.05	576.39

During FY 1998, compressed natural gas (CNG) comprised the largest portion of alternative fuel consumption with 91.7 percent. An ethanol and gasoline blend (E-85) is the second most consumed alternative fuel with 6.5 percent.

The U.S. Postal Service uses the majority of alternative fuels, consuming 67.6 percent of the total alternative fuel used by the Federal Government. The Postal Service's consumption of 389.6 billion Btu of CNG comprises 2.6 percent of the agency's total vehicle fuel consumption.

The Department of Energy has made efforts to provide the private and public sector with information on issues concerning AFVs. An Alternative Fuels Hotline (1-800-423-1DOE) was established in June 1992 to provide callers from Federal agencies, industry and the public with answers to questions on AFVs. By calling the toll free number, callers can request information on AFVs. In 1998, 9,104 calls were received and 107,358 documents were distributed. Many callers had questions concerning the purchase and conversion to of AFVs, EPACT and Clean Air Act requirements, funding and tax incentives, and training and safety issues.

The Alternative Fuels Data Center (AFDC), which is located at the National Renewable Energy Laboratory (NREL) in Golden, Colorado, may be accessed by the public on the Internet at <http://www.afdc.nrel.gov>. The site was accessed more than 2.5 million times in 1998, indicating a growing public interest in alternative fuels. The AFDC is the central repository for data from DOE's alternative fuel vehicle demonstration programs. The AFDC stores data on demonstration programs that receive funding support authorized by the AMFA of 1988. Information collected and provided by the AFDC includes:

- data on 600 government fleet vehicles;
- refueling site information for CNG, LPG, Ethanol, and Methanol;
- information on emissions, mileage, fuel economy;

- information on emissions, for flexible fuel vehicles running on alcohol fuels and gasoline;
- repair and maintenance logs for alternative fuel fleet vehicles;
- heavy duty and transit bus data on performance, emissions, fuel economy, and mileage;
- data on the Clean Fleet Program - run by Federal Express and South Coast Air Quality Management District (a controlled comparative study of operating data from gasoline vehicles and different types of alternative fuels).

Federal efforts to expand deployment of AFVs were boosted by the Clean Cities Program during FY 1998. The Clean Cities Program, initiated by the DOE in September 1993, is a voluntary program designed to increase fleet vehicle alternative fuel use by encouraging partnerships between fuel suppliers, vehicle manufacturers, fleet managers, and Federal, State, and local government agencies. DOE supports Clean Cities participants through the placement of Federal vehicles and by maintaining a national hotline and a support staff member at each of its ten regional support offices, which provide local assistance concerning federal and State requirements for AFV acquisitions and conversions and assist local Clean Cities with their alternative fuels market development. In 1998, 14 new cities were awarded the Clean Cities designation, for a total of 74 Clean Cities. DOE has established a number to handle inquiries from cities interested in joining the program: 1-800-CCITIES. The program's Internet address, www.cccities.doe.gov, was accessed 505,144 times during FY 1998.